# NETWORK WORLD

The Newsweekly of User Networking Strategies

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# Infonet to offer flexible service pack

By Barton Crockett
Senior Editor

EL SEGUNDO, Calif. — Infonet Services Corp. plans to introduce today a new package of flat-rate billing plans, circuit-switched services and net management capabilities for its international value-added network.

The Virtual Private Data Network (VPDN) package will enable customers to build custom networks that rival the functionality of private nets at a cost lower than standard packet-switching services, Infonet claimed.

Some analysts agreed. The combination of offerings will "provide customers with functionality equivalent to a private data network on a shared-use basis," said Berge Ayvazian, vice-president for communications research at The Yankee Group, a consultancy in Boston.

VPDN has four components: two flat-rate billing plans for packet-switched traffic, Vmesh and Vstar; a circuit-switched service called Vstream; and a new personal computer-based net management system dubbed Network Control Center-PC.

Vmesh is a flat-rate billing plan for communications between any number of user devices with dial-up or dedicated access

*(continued on page 49)*

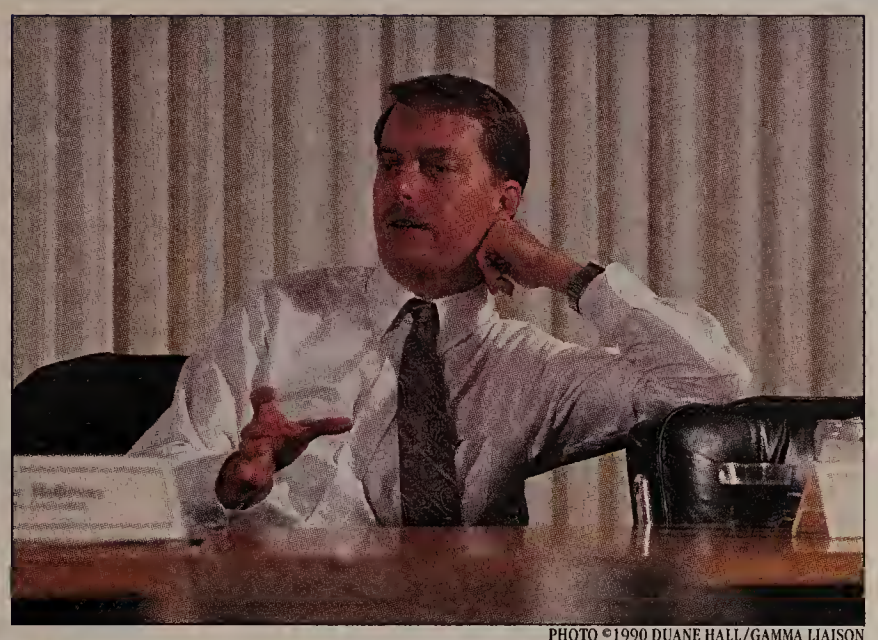


PHOTO ©1990 DUANE HALL/GAMMA LIAISON

**IBM's Mark Knittel details the company's net management strategy.**

# *IBM execs open up on net management issues*

Company explains plans to support OSI protocols under NetView, details role of LU 6.2 in net control.

By Paul Desmond
Senior Editor

RESEARCH TRIANGLE PARK, N.C. — IBM is evolving its network management strategy to keep pace with user requirements for open systems and is pursuing numerous options for supporting non-IBM equipment under NetView, IBM executives told *Network World* in a briefing here.

The executives spelled out how IBM hopes to offer new ways to support Open Systems Interconnection net management protocols under NetView and detailed the role they expect LU 6.2 to play in network management. They also said the much-touted network management repository could be announced by year end.

If executed, the plans could help users better integrate disparate network management systems with NetView while simultaneously migrating toward OSI network management standards.

NetView is the umbrella name for a combination of products used to manage IBM Systems Network Architecture nets. It was the first of the so-called integrated network management systems, which are intended to provide control over all types of network

*(continued on page 50)*

# Users unite to design own help desk tool

Expert system-based product runs on LANs, promises to increase help desk productivity.

By Wayne Eckerson
Senior Writer

COLORADO SPRINGS — Twenty-eight companies that helped design an expert system-based tool for automating help desk operations said last week they're now beta-testing the product.

The software, called Helpdesk Expert Automation Tool (HEAT), was jointly designed by a consortium of U.S. and Canadian companies and developed by Bendata Management Systems, Inc., a software development firm here that organized the consortium.

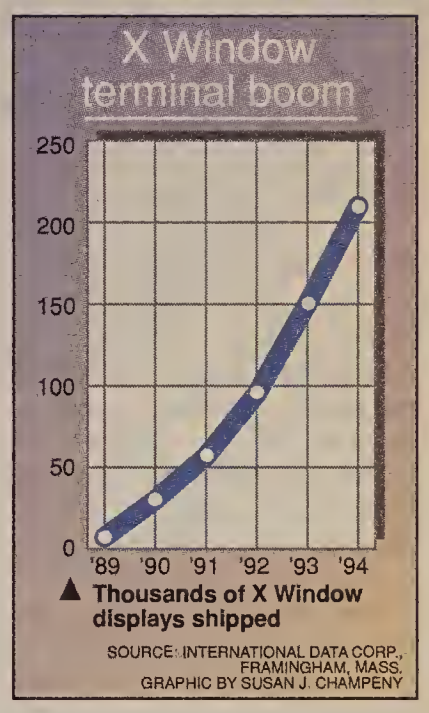
Participating companies included National Semiconductor Corp., New York Life Insurance Co. and Texaco, Inc. to name just a few (see graphic, page 7).

HEAT runs on DOS-based Intel Corp. 80386 personal computers attached to any Network Basic I/O System-compatible local-area network. It features an expert system that walks help desk personnel through a series of questions they can ask callers to pinpoint the exact cause of a problem and suggest solutions.

The product also supports a relational data base that gives help desk personnel quick access to information about callers, their system configurations and internal resources needed to solve problems.

HEAT is designed to replace current mainframe-based help desk systems, which are expen-

*(continued on page 7)*




# Competition heats up for X terminals

By Bob Brown
Senior Editor

The influx of major computer vendors into the fast-growing X Window terminal market promises to drive prices lower and spur the introduction of new capabilities, making the desktop devices an even more attractive option for network users.

X Window terminals are graphics terminals that enable a user to access, through multiple windows, applications running on a variety of host systems.

Worldwide, about 11,300 X Window terminals were sold in 1989, and that figure is expected to increase about sixfold to 68,000 this year, according to International Data Corp. (IDC), a market research firm in Framingham, Mass.

Shipments will grow by about 112% a year and revenues by

*(continued on page 48)*

## NETLINE

**MICROSOFT ROLLS OUT** a shrink-wrapped version of LAN Manager it will sell to users and resellers. Page 2.

**HUMAN ENGINEERING** plays a pivotal role in users' voice processing plans. Page 2.

**DEC PLEDGES** to link VAXclusters over FDDI nets, significantly increasing the distance between them. Page 2.

**BIG BLUE DEVELOPS** a prototype packet switch based on its own fast packet technology. Page 4.

**THE FIRST LOSS EVER** for DEC is due in part to $400m charge brought on by the retirement of 6,000 workers. Page 8.

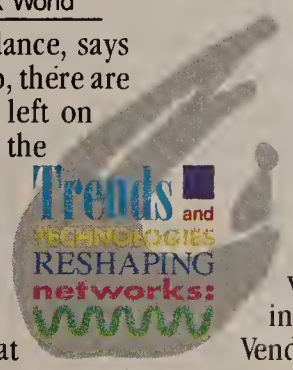
**NETWORKABLE VIRUSES** can be disposed of without taking down the whole net. Page 32.

NEWSPAPER

## FEATURE

# Users must step carefully when vendors merge

By Clifford Worth
Special to Network World




When elephants dance, says an old Indian proverb, there are two kinds of people left on the dance floor: the quick and the dead.

In the business jungle, the vendors are the elephants. When vendors begin the mating dance that ends with a merger, users need to either step lively to preserve their own interests or risk getting caught up in the turmoil and losing strategic relationships and other competitive assets.

Getting a vendor to deliver as promised requires that a net manager spend a great deal of time and research effort selecting the proper vendor and cultivating a good relationship. Vendor mergers can throw a monkey wrench into that process. Consequently, they've become a great source of concern for net managers

*(continued on page 35)*

# Microsoft spells out plans to market LAN Manager

## Company will pump money into shrink-wrapped version of product to be sold to users, resellers.

By Susan Breidenbach
West Coast Bureau Chief

REDMOND, Wash. — LAN Manager contributed next to nothing to the $1.18 billion in sales Microsoft Corp. posted in its fiscal 1990 year, ended June 30, but the product still got top billing at the company's annual financial analysts' meeting here last week.

Microsoft used the occasion to officially unveil the previously announced shrink-wrapped version of LAN Manager. The company said it developed this version to sell to resellers and users because its original OEM partners have failed in their efforts to push LAN Manager.

The sales strategy for the shrink-wrapped product outlined at the meeting includes a Network Specialist Program for resellers, a new direct sales force, aggressive pricing and innovative packaging. Company executives stressed that they would put the necessary resources behind LAN Manager to get it moving.

"What's coming across loud and clear is that they're preparing the financial community for a slide in Microsoft's profitability while they pump money into the LAN Manager war," said Andrew Seybold, publisher of "The Out-

*(continued on page 50)*

# Human engineering critical in voice processing plans

## The little things can add up to success or failure.

By Bob Wallace
Senior Editor

Anticipating customer reaction to voice response and speech recognition systems, as well as properly writing scripts and menus, can make the difference between a successful system implementation and failure, according to users.

The so-called human engineering side of voice processing, in fact, can take more time than the initial system evaluation and implementation, and it can require outside expertise.

American Express Co. learned the importance of human engineering in a pilot test of a speech recognition system at a company facility in Omaha, Neb.

The company wanted to use the technology to reduce staff costs by automating credit card authorization for stores that telephone in credit checks instead of using card readers. Anita Bounds, manager of worldwide telecommunications for American Express, said these calls cost 33 cents a piece, 22 cents for staff costs and 11 cents for communications costs.

When the company installed a voice recognition system, it "developed 70 different scripts for the system to try to get merchants to say their dollar amounts in single digits, such as five, two, nine

*(continued on page 51)*

# FDDI links would extend distances in VAXclusters

By Jim Brown
Senior Editor

BOSTON — Digital Equipment Corp. last week announced plans to develop software that will enable customers to use Fiber Distributed Data Interface networks to interconnect VAX minicomputers configured in a VAXcluster environment.

FDDI will enable DECnet users to significantly extend the distance between VAXes in a VAXcluster, expand disaster recovery options and configure multiple VAXclusters into a single group, thus easing management tasks.

At a briefing here during the third week of DECworld '90, DEC said it will add device driver software to the VAXcluster software in its VMS operating system, allowing VAXclusters to operate over FDDI networks.

The device driver will work with an interface board DEC is developing to link VAX 6000 minicomputers and VAX 9000 mainframes to a DECconcentrator 500, which provides direct access to a 100M bit/sec FDDI network.

VAXclusters make multiple VAXes appear as if they were one system. This enables users to access applications and data residing on any VAX in the VAXcluster as if they resided on the VAX to which they are attached. VAXclusters also enable users to load

*(continued on page 50)*

# Briefs

**Mitel strikes back at AT&T.** Mitel, Inc., a subsidiary of Mitel Corp., last week filed a claim in a Florida court against AT&T for allegedly taking predatory actions against the company. Mitel charged that AT&T, in letters to Mitel customers, spread information about the company that "tended to confuse, mislead and intimidate" users. AT&T's letters suggested that British Telecommunications PLC's plan to sell its 51% interest in Mitel was cause for concern and offered Mitel customers a trade-in allowance if they bought AT&T products.

**Teleport looks for a big brother.** Teleport Communications-Boston last week asked the Massachusetts Department of Public Utilities to assist in its bid to get New England Telephone and Telegraph Co. to offer the connections Teleport Communications needs to link its Boston fiber network to phone company central office switches. A similar arrangement was ordered in May 1989 in New York by the New York State Public Services Commission.

**US Sprint hikes WATS rates.** US Sprint Communications Co. has followed rivals AT&T and MCI Communications Corp. and boosted rates for its Dial 1 WATS, its flagship WATS service, by an average of 2%. The new Dial 1 WATS rates will take effect, pending Federal Communications Commission approval, on Aug. 5. Dial 1 WATS is priced using six usage bands. The cost per minute for a Band 1 daytime call would rise from 16.50 cents to 18.30 cents for customers with five to 99.99 hours of usage.

**InteCom deal will go through.** Wang Laboratories, Inc. last week dismissed rumors that the pending sale of its InteCom, Inc. subsidiary to Matra Communications of Paris is in danger. In March, after more than a year of trying to unload InteCom, Wang announced plans to sell the private branch exchange company to Matra, an $850 million subsidiary of Matra S.A. The deal, which was supposed to go through in April, is now expected to be consummated this week.

**Rates to Mexico slashed.** AT&T last week announced an agreement with Telefonos de Mexico, S.A. de C.V. (TelMex) to slash the cost of private lines in Mexico and between the U.S. and Mexico. TelMex said it would cut monthly service charges for selected private-line services by as much as 60%. AT&T announced cuts of 41% to 55% for T-1 links to Mexico that begin within 75 miles of five border crossing points.

**Telecom*USA exec moves to MCI.** MCI Communications Corp. last week named Gen Gabbard, chairman and chief executive officer of Telecom*USA, Inc., to the post of executive vice-president and chief financial officer of MCI. Gabbard will assume that position when MCI's pending merger with Telecom*USA is approved.

# CONTENTS



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# IBM develops prototype switch based on fast packet technology

Vendor claims its technology is better than others because it's faster and processes key tasks in hardware, not software.

**By Paul Desmond**
Senior Editor

RESEARCH TRIANGLE PARK, N.C. — IBM's research unit has developed a prototype fast packet switch capable of handling more than 1M packet/sec that could take advantage of emerging high-bandwidth carrier services.

IBM claims its technology is superior to that backed by standards groups — including the Consultative Committee on International Telephony and Telegraphy and the Institute of Electrical and Electronics Engineers, Inc. — because it is simpler, faster and handles key tasks in hardware rather than software.

But the announcement of products based on the technology, if IBM decides to offer any, will largely depend on when carriers develop services with which the switch could be used.

"With the advent of high-bandwidth links for backbone networks, we will evolve [our equipment to use] some variation of fast packet architecture," said Charles Murphy, a senior technical staff member at IBM. The high-speed links include 45M bit/sec T-3 services and Synchronous Optical Network carrier facilities that support speeds from 45M bit/sec to multiple gigabits.

Murphy said the fast packet technology IBM developed will outperform products based on fast packet specifications from groups such as the CCITT and IEEE because of the way data is handled by intermediate nodes in a data path.

The IBM fast packet prototype, dubbed Paris, implements routing information at

*(continued on page 51)*

# *U.S. reps instruct GAO to probe FCC's ability to regulate telcos*

Markey, Synar concerned about ability to spot cross-subsidies.

**By Anita Taff**
Washington Bureau Chief

WASHINGTON, D.C. — Two congressmen have asked the General Accounting Office (GAO) to reopen an investigation into whether the Federal Communications Commission has enough resources to police telephone companies adequately.

Rep. Edward Markey (D-Mass.), chairman of the subcommittee on telecommunications, and Rep. Mike Synar (D-Okla.) recently asked the GAO, the chief auditing arm of the government, to specifically examine whether the FCC has the resources to uncover cross-subsidization and protect ratepayers.

"As the subcommittee continues its deliberations on national telecommunications policy, it is important that the commission, the agency responsible for protecting consumers and competitors from cross-subsidization, has the capacity and resources to carry out its regulatory responsibilities," Synar said in a statement.

The nagging question of the FCC's ability to carry out its responsibilities has become increasingly controversial during the past few years. Users groups, consumer groups and carriers have questioned the FCC's ability to oversee a rapidly growing industry in such major proceedings as price cap regulation and Open Network Architecture.

An aide to Synar said the GAO report could have a substantial impact on the way the U.S. House of Representatives treats

*(continued on page 49)*

# NET reports first operating loss; CEO Smith steps down from post

**By Bob Brown**
Senior Editor

REDWOOD CITY, Calif. — Network Equipment Technologies, Inc. (NET) last week reported its first operating loss and announced that Bruce Smith, the company's chief executive officer, will step down immediately.

NET posted a $13.3 million net loss — a $21.9 million pretax loss — for the fiscal first quarter, ended July 1, compared to earnings of $4.8 million in last year's first quarter. NET said revenue for the quarter was $26 million, down 38% from the $41.8 million of the first quarter last year.

The company blamed its poor financial performance on a decline in shipments, largely due to a lack of new account sales in the latter half of fiscal 1990, which ended March 31.

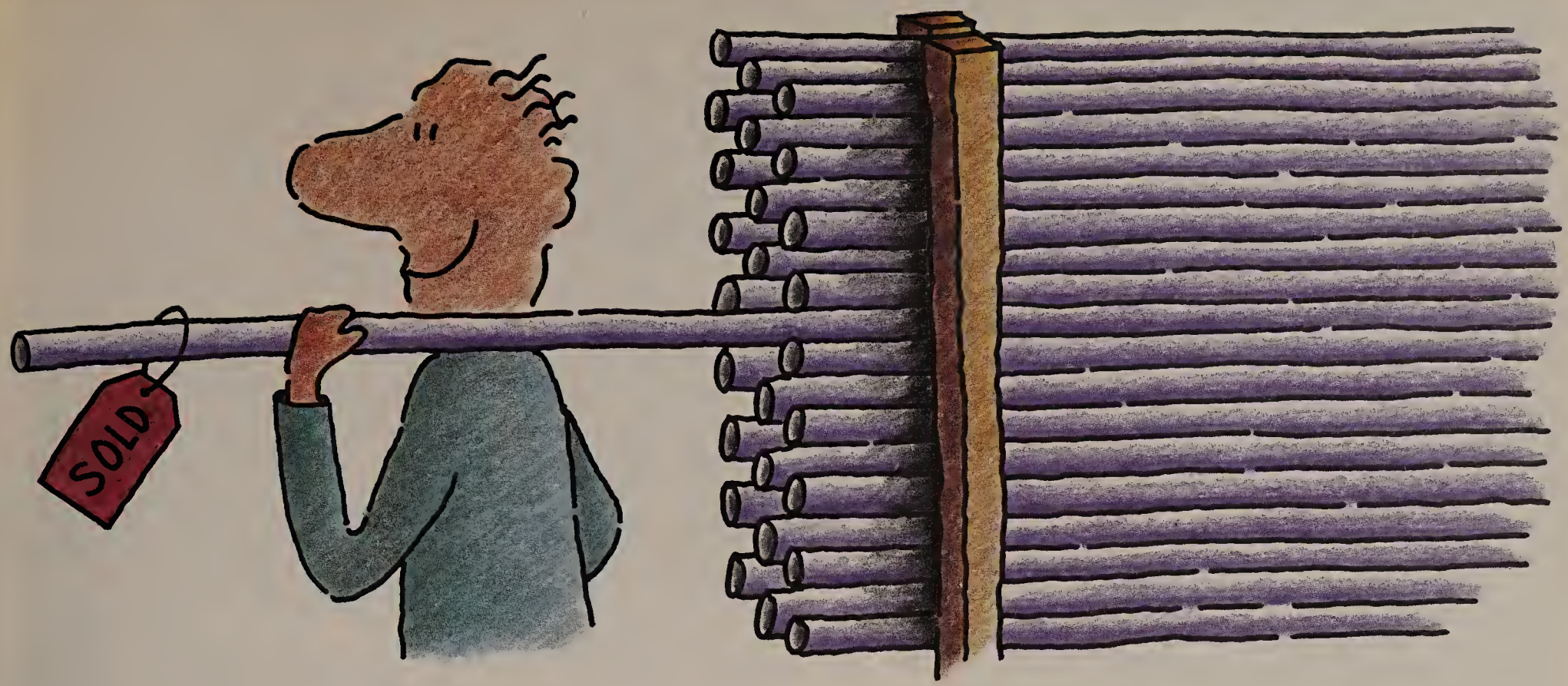
The company is trying to rebound after disclosing in April improprieties regarding product orders and shipments, as well as the dismissal of several employees involved in the incidents ("NET blames 4Q woes on sales irregularities," *NW,* April 16).

NET executives, who said the company's investigation into the incidents is over, acknowledged that concerns among its current and prospective customers about these events may have extended or affected buying decisions.

The company reported strong sales of its low-end products, such as the Integrated Digital Network Exchange (IDNX) 20, but disappointing sales of its higher end IDNX offerings, analysts said.

Smith's departure, which he previously

*(continued on page 49)*

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# Users unite to design own help desk tool

*continued from page 1*

sive and cumbersome to use, said Ronald Muns, president of Bendata. He added, however, that companies can use HEAT to send commands and data to host-based applications by emulating an IBM 3270 terminal.

HEAT is scheduled for commercial release this fall, according to a spokeswoman at Bendata.

"The 28 companies [in the consortium] got together and decided what they would like to see in a help desk problem management system, and then we designed it according to their specifications," Muns said.

The consortium members met three times late last year to hammer out requirements for the help desk product. Each paid a fee of $9,000 to join the consortium, which entitles them to a free site license once the product is commercially available, Muns said.

### Function and features

HEAT runs under Quarterdeck Office Systems DESQview 386, which is a multitasking, multiwindowing DOS-based control program.

DESQview enables help desk workers to run HEAT in one window while also running a host-based application such as IBM's NetView in another.

Companies can use HEAT to communicate with host applications using any terminal-emulation program that supports IBM's High Level Language Application Programming Interface (HLLAPI).

With HEAT, users can write scripts, or short programs, to automate the process of entering proprietary or 3270 commands required to run certain host-based tasks such as restarting a terminal or sending an electronic message.

HEAT also enables users to customize their own expert systems by compiling a list of problem types, symptoms and solutions in a tree-structured data base. The system prompts the help desk staff with questions to ask callers and leads them through the tree structure until the correct solution is found.

Consortium members asked Bendata to design HEAT so that companies could customize the structure and content of its data base.

For example, HEAT requires companies to define caller profiles, which contain background information about callers and their system configurations. Thus, when a call comes in, help desk personnel can key in the caller's name or terminal identification and immediately view the caller's title and branch office location as well as a record of previous help desk calls and the caller's hardware and software equipment, by manufacturer's name and code.

HEAT also allows companies to define types of problems that could arise in their organization, prioritize the urgency in which each of those problems should be treated and list who is qualified to fix them.

In addition, HEAT enables help desk personnel to set alarms as a reminder to check back with a caller or technician to determine whether a problem has been satisfactorily resolved. HEAT can suggest alarm times based on the type and priority of the call, and it can escalate alarms to a help desk supervisor or the manager of an assigned technician if action is not taken to resolve problems by a certain time.

Other features enable help desk personnel to:

- Search through call records for problems similar to one on which they are currently working by using multiple variables.
- Establish a single file to record multiple calls caused by a major system failure.
- Audit changes made to call records.
- Automatically dial phone numbers.
- View a graphical image such as a hardware diagram, chart or map.

Users that are beta-testing HEAT are generally enthusiastic.

"HEAT will be an exceptional product," said Sherry Lessner, manager of information development and support at System One Corp. in Houston. "There's nothing like it on the market."

Lessner said the expert system capabilities offered by HEAT will enable System One to cut the time it takes to train help desk personnel from six months to just six weeks.

HEAT costs $7,500 for the first workstation on which it is loaded, after which it costs $4,500 for the second to fourth workstations, $4,000 for the fifth to ninth workstations and $3,500 for 10th workstation and beyond.

## HEAT partners

A partial list of companies that helped design Helpdesk Expert Automation Tool (HEAT)

| | |
|---|---|
| Allegheny Ludlum Corp. | Land O'Lakes, Inc. |
| Amoco Corp. | Leviton Manufacturing Co., Inc. |
| Avis Rent-a-Car System, Inc. | Lone Star Gas Co. |
| Black & Decker Inc. | National Semiconductor Corp. |
| B.C. Systems Corp. | New York Life Insurance Co. |
| U.S. Bureau of Reclamation | Nike, Inc. |
| Cleveland-Cliffs, Inc. | Northern Telecom, Inc. |
| Comdisco, Inc. | Northern Trust Co. |
| Computer Sciences Corp. | Peat Marwick & Main |
| Farmland Industries, Inc. | Prudential Insurance Co. of America |
| F.W. Woolworth Co. | Public Service Co. of Indiana, Inc. |
| ICI Americas, Inc. | System One Corp. |
| Inland Steel Co. | Texaco, Inc. |

SOURCE: BENDATA MANAGEMENT SYSTEMS, INC., COLORADO SPRINGS



See The FAXNeT Form on Page #26

# DEC posts loss of $257m for its fiscal 4Q

By Bob Brown
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. last week posted the first quarterly loss in its 32-year history after taking a $400 million pretax charge against earnings to cover costs relating to the voluntary retirement of up to 6,000 workers.

DEC posted a $256.7 million loss for its fourth fiscal quarter, ended June 30, down from earnings of $313.2 million in last year's fourth quarter. DEC's earnings for this year's fourth quarter would have been about $85.3 million without the onetime pretax charge.

DEC reported a 3.7% drop in revenue, from $3.49 billion in the fourth quarter last year to $3.37 billion in this year's fourth quarter.

For the year, DEC reported earnings of $74.4 million, down 93% from $1.1 billion last year. The year's earnings were negatively affected by $550 million in pretax charges, including a $150 million charge in the third quarter for employee retraining and relocation expenses, as well as a severance program that led to the voluntary departure of about 3,000 employees.

*(continued on page 49)*

# *IBM, hospital develop LAN-based imaging system for medical files*

By Tom Smith
New Products Editor

WHITE PLAINS, N.Y. — IBM last week unveiled a local-area network-based imaging system that lets medical institutions capture, store and retrieve images of medical records.

IBM Medical RecordsPlus/400 enables users to request image files or portions of patient data, such as lab reports, faster than hunting through written reports.

The offering, a combination of new and existing products, enables users to develop a translation program that converts data from host-based medical record applications into a format suitable for display on image workstations attached to an IBM Token-Ring Network.

The new system is based on IBM's existing Application System/400 ImagePlus system, a hardware/software package running on an AS/400. It was developed in collaboration with Beth Israel Medical Center in New York, according to Steve Hart, program manager in the advanced image department of health industry marketing at IBM in Atlanta.

Beth Israel, a hospital with nearly 1,000 beds, began pilot-testing the product earlier this month. Although the hospital has not tested the conversion of host application data for display on the imaging system, it is scanning records of about 15 inpatients per day as they are discharged.

Patient records typically contain 80 to

*(continued on page 51)*

# FCC lets AT&T, RBHCs continue existing services

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The Federal Communications Commission last week granted AT&T and the RBHCs permission to continue providing enhanced services through their telephone units, pending the legal resolution of the agency's Third Computer Inquiry decision.

In response to a request from the regional Bell holding companies, the FCC issued a temporary waiver that allows local carriers to continue their existing enhanced services operations. However, the waiver also stipulated that the carriers are not permitted to roll out new enhanced services through their telephone units.

AT&T will also be allowed to continue offering its existing enhanced services, but because the long-distance carrier operates in a more competitive environment and was subjected to less stringent requirements in Computer III rules, the waiver gives it permission to offer new services through the telephone unit.

The waiver assures 160,000 enhanced services customers that their services will not be discontinued while the carriers reorganize their operations. The RBHCs will be able to provide service through their telephone units until the FCC holds a hearing on regulation of enhanced services.

In June, an appeals court in California overturned the FCC's Computer III decision, which eliminated the requirement that AT&T and the RBHCs must offer enhanced services through separate subsidiaries.

The court ruled that the FCC had failed to compile enough evidence to support the rule change and that it had overstepped its bounds in extending its rules to provision of intrastate enhanced services.

The court's ruling created a legal limbo for AT&T and six of the seven RBHCs,

*(continued on page 51)*

## Worth Noting

"With only 27% of small businesses with personal computers using local-area networks, networking products vendors should find this market to have excellent potential."

**Warren Childs**
Project director and market research manager
Business Research Group
Newton, Mass.

## People & Positions

**Rolm Systems,** a wholly owned subsidiary of **Siemens AG,** recently announced that **Ray AbuZayyad** will leave his posts as president and chief executive officer of the private branch exchange maker to return to **IBM.** He is leaving Rolm to become president of the Storage Systems Products Division at IBM.

AbuZayyad joined IBM initially in 1962 as an engineer. In his earlier stint with IBM, he held various engineering and managerial positions in IBM's Systems Development Division and General Products Division. He was named president of Rolm in April 1987, when it was owned by IBM.

**Peter Pribella,** group president of Private Communication Systems for Siemens and chairman of Rolm, will assume the additional responsibilities as president and chief executive officer of Rolm.

**Juergen Wuesteney,** executive director of Private Communication Systems, has been given the additional responsibility for Rolm development activities in Santa Clara, Calif.

Both Pribella and Wuesteney will move from West Germany to the U.S., and the moves are an indication of the increasing importance of the U.S. market for the private telecommunications business in Siemens.

The appointments become effective Aug. 1.

# Matrix switch maker Bytex plans foray into LAN mart

## Analysts predict firm will offer bypass capabilities.

**By Bob Brown**
Senior Editor

SOUTHBOROUGH, Mass. — Bytex Corp., the leading supplier of fault-tolerant matrix switches, recently announced plans to expand into the local-area network market.

Bytex executives said they formed the LAN Business unit in response to customers seeking better LAN reliability, availability and technical control.

"As more and more mission-critical applications are being run over LANs, a satisfactory solution to these issues becomes more urgent," said Jeffrey Goodman, president of Bytex.

While Bytex officials refused to divulge specifics on the types of LAN products the company plans to offer, industry watchers said they believe that Bytex will provide LAN users with some of the same bypass switching capabilities it offers for wide-area network environments.

Matrix switches are typically used to divert net traffic from failed front-end processors to backup units attached to the switch.

Joe Skorupa, the newly appointed director of LAN marketing at Bytex, said network managers who are used to 99.5% uptime on their WANs want the same reliability for their LANs, which more often average about 95% uptime.

"The folks we deal with traditionally have had responsibility for wide-area networks," said Skorupa, who was previously director of product planning at Racal-Interlan. "But now they are being asked to take over responsibility for enterprise LANs."

Skorupa said one long-term goal of the new unit will be to provide an upgraded network management system that would monitor Bytex's WAN and LAN products, he added. Bytex currently offers its Unity Management Systems to manage and control its matrix switches.

Bytex plans to make its first new LAN product announcements in the fall, he added.

The move into the LAN market, which has been in the works since the beginning of the year, is also seen as way for Bytex to diversify at a point where the matrix market's growth is fairly slow, industry watchers said.

Bytex executives agreed that

*(continued on page 10)*

## INDUSTRY BRIEFS

**Digital Communications Associates, Inc. (DCA)** last week said it has acquired a 20% stake in **Helix Software Company, Inc.,** a maker of memory management software for personal computer applications, networking and communications products. Terms of the deal were not disclosed.

Under the agreement, Helix will provide DCA with licenses to use technology from Helix's Headroom and Netroom products to enhance its own personal communications products.

Bertil Nordin, chairman of DCA's board of directors, will become a member of Helix's board.

**Cabletron Systems, Inc.,** a Rochester, N.H.-based provider of local-area network equipment, last week announced that it will begin offering customers worldwide on-site network support via an agreement with **Intel Corp.**

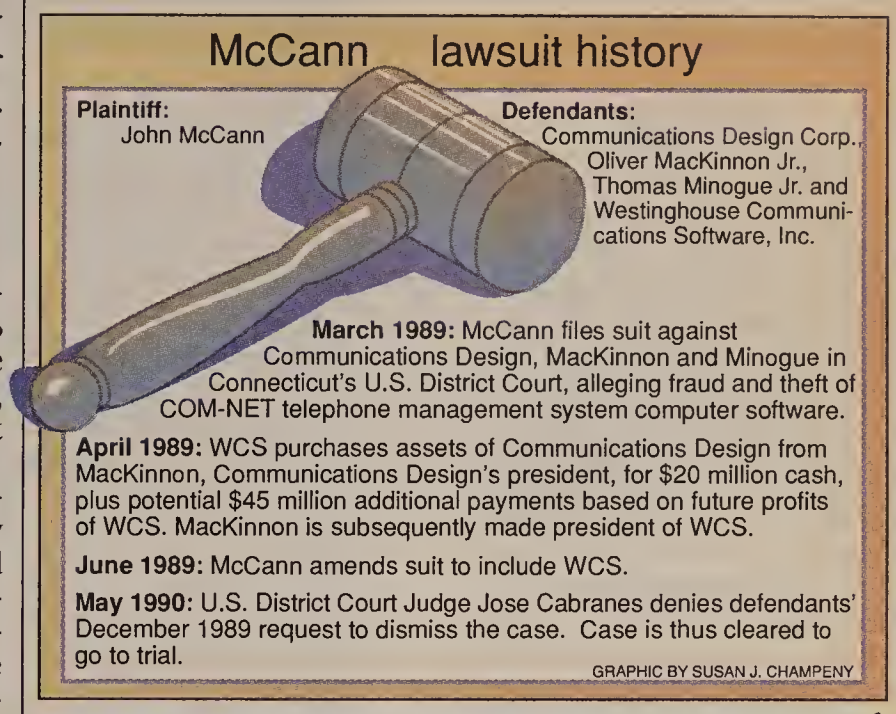
The agreement will greatly expand Cabletron's on-site service and support. Cabletron will be able to coordinate service through Intel in locations where it previously had little or no presence. Cabletron will continue to serve as customers' point of contact for technical assistance and network maintenance.

Intel has some 800 service employees based in 22 countries.

The expanded service is expected to be available in September, after Cabletron trains Intel personnel to service its 1.3 million nodes worldwide.

The cost of the service will vary depending on a user's network configuration. Users will be able to purchase the service for two-hour response, four-hour response or next-day response.

Intel recently signed a similar agreement with Banyan Systems, Inc., a Westborough, Mass.-based LAN firm.




# Suit over net control pack may hurt users

## Plaintiff charges Westinghouse unit is marketing stolen telecommunications management software.

**By Ellen Messmer**
Washington Correspondent

NEW HAVEN, Conn. — Westinghouse Communications Software, Inc. (WCS) will be going to trial later this year to fend off a $65 million lawsuit that alleges the company is marketing stolen software.

The defendants in the case (see chart) deny the fraud charges brought by John McCann, a self-employed computer communications consultant. But should a jury deliver a guilty verdict, the decision may affect WCS customers that have bought the company's CMS-I, CMS-II and TMS-II telecommunications management software.

Users of Ameritech's Ameritech Network Management (ANM) system, announced last April, may also be affected. ANM relies on CMS-II billing functions as a third of its packaged network management offering.

McCann claims that the three WCS programs were derived from COM-NET, a software package he developed in 1981 for Communications Design Corp. WCS purchased Communications Design in April 1989 and was aware of the lawsuit, which McCann initiated one month prior to the sale.

In that suit, McCann said Communications Design President Oliver MacKinnon Jr. persuaded him to design a telecommunications management program in 1979, when McCann was working at Data General Corp. as a systems engineer. McCann worked on the program in his spare time while still at DG.

The program was delivered for use on a DG Eclipse computer in 1980, but both he and MacKinnon decided that the program would be better adapted to the IBM 370/158 mainframe due to its faster processing speed.

According to McCann, he prepared the IBM-based COM-NET program in 1981. He said he and MacKinnon signed an agreement in May of that year in which McCann agreed to cede rights to the program in exchange for the right to buy 35% of Communications Design's stock at $1 per share.

McCann said he left DG to become Communications Design's vice-president of operations in June 1981, but he alleges that MacKinnon and his lawyer, Thomas Minogue Jr., were already plotting to defraud him.

He said that after requesting to purchase the stock a few weeks after joining the company, MacKinnon and Minogue called him to a meeting and told him the firm was in dire financial straits.

McCann said he was informed that the COM-NET program, which needed debugging, would have to be abandoned due to lack of funds. He said he left shortly thereafter, believing COM-NET had been scrapped and without receiving the stock.

But McCann said he later came upon a May 1988 Datapro Research Corp. report that showed Communications Design had delivered a COM-NET product in 1981 and had installed 120 units.

In 1989, on the eve of the sale of Communications Design to WCS, McCann filed a suit saying he had been tricked out of partial ownership of Communications Design and seeking $65 million in damages.

*(continued on page 10)*

# Specialty retailers proffer list of demands to vendors

## Group mulls forming consortium, shared net.

By Bob Brown
Senior Editor

DALLAS — A group of specialty retailers recently met here with 19 network equipment and service vendors to outline their demands for equipment and services that would satisfy their unique communications needs.

The retailers, which represent $12 billion in combined revenues and about 9,500 stores, gathered for the first time to hash out the possibility of forming a consortium that would work to lower net equipment and services costs. The group also began to address the feasibility of supporting a shared retail transaction net.

Officials from B. Dalton Booksellers, The Gap, Inc. and Waldenbooks Company, Inc., were among the users on hand. The group will meet again in mid-September to decide whether to go ahead with the shared network.

Retailers at the meeting issued a mission statement designed to get vendors working on providing the types of network products and services desired by specialty retailers if they decide to form a consortium.

The retailers called for a shared network that "should have the least connect time, fastest response time and most universal connectivity."

The initial focus of the network would be for credit card authorizations, but it might expand down the road to support electronic data interchange, host data transfer and voice communications, among other applications, according to the statement.

Vendors in attendance included AT&T Tridom, GTE Spacenet Corp. and Racal-Milgo SkyNetworks, as well as firms such as Ameritech and US West Communications.

Earlier this year, B. Dalton, a book store company with more than $1 billion in annual sales, commissioned a study by consultancy Kurt Salmon Associates in Atlanta to determine what types of retailers would be interested in sharing a network ("Specialty retailers mull shared network project," *NW,* March 26).

The retailers have retained Kurt Salmon Associates and Electronic Data Systems Corp., the Dallas-based systems integrator, to conduct another survey of specialty retailers on how a consortium would best be organized to serve their needs. The results of this survey will be presented at a Sept. 15 meeting in Chicago.

At that meeting, the retailers will start work on a request for information and request for technology for the vendors, said Fred Morsheimer, director of MIS at Trader Joe's Co., a South Pasadena, Calif.-based food and beverage retailer.

The specialty retailers, most of which do not generate enough network traffic to justify building their own private networks, said enthusiasm for creating a shared network to take advantage of economies of scale has been building throughout the year.

However, retailers have made frustrated attempts at getting vendors to meet their network needs, Morsheimer said. "The technology is there to provide the services we need, but the vendors haven't had the incentive to provide the services since, individually, the specialty retailers don't generate a lot of revenue for the vendors," he said.

Vendors that attended the meeting were generally in support of the consortium.

"Not a single one was against it," said Mark Lilien, vice-president of systems and distribution at B. Dalton. "Some vendors said they would prefer for us to band together so that they could provide products meeting a consistent set of standards, while others said they could meet each of our needs individually."



# Bytex plans LAN mart foray

*continued from page 9*

overall matrix switch demand is slowing and said they hope to make up for any market lull by selling into the fast-growing LAN market. Two weeks ago, Bytex reported a 38% increase in earnings and 15% rise in revenue for its second quarter over last year's corresponding period.

Consistent with its strategy to expand into the LAN market, Bytex earlier this month announced that it had acquired privately held VANCE Systems, Inc., a Chantilly, Va., maker of LAN protocol analyzers. Bytex will now market the VANCE Analysis and Test System (ATS) LAN 1000 series of protocol analyzers, which are used to analyze IEEE 802.3, 802.4 and 802.5 networks.

Andy Schopick, an independent consultant in Southport, Conn., said Bytex's foray into the LAN business makes sense given the matrix switch business's somewhat lackluster growth rate of about 10%.

"It's an absolute necessity to get into a market that will take them beyond the traditional matrix switching marketplace," he said. "It looks as if Bytex has plans to provide a greater degree of functionality and integration between LANs and WANs, but exactly how this thrust is going to take shape is unclear."

Bytex's entry into the LAN sector is good news for Steve Clevenger, vice-president of data operations at Colonial Penn Group, Inc., a Philadelphia-based Bytex matrix switch user. "There is a need to control LANs from a central location," Clevenger said. "I'll be interested to see what Bytex comes up with."

# Suit over pack may hurt users

*continued from page 9*

MacKinnon's lawyer, Sheila Ozalis, from the firm of Winthrop, Stinson, Putnam and Roberts in Stamford, Conn., tells a different version of the story.

Ozalis said McCann was terminated in 1981 because his work was poor and the IBM-based version of COM-NET he developed had to be abandoned because it was a disaster. She claims the product that was eventually sold to WCS was actually developed by other Communications Design programmers. Ozalis called McCann a disgruntled employee who brought a baseless suit for opportunistic reasons.

Besides saying the product Communications Design sold to WCS was developed by programmers other than McCann, Ozalis contends McCann has exceeded the statute of limitations, which poses a time limit for filing a suit.

"If we win on the statute of limitations, it means that McCann should have brought his case eight years ago instead of sleeping on it," Ozalis said. "He waited until the night before Communications Design was to be purchased by Westinghouse in order to get a good settlement."

This week, Judge Jose Cabranes of the U.S. District Court for the District of Connecticut will determine whether the case will be decided on the statute of limitations or broader issues.

He may also decide when and under what conditions WCS may have to release technical data about its products McCann wants in order to prove his case. McCann will need detailed information about WCS products to get expert witnesses to compare and contrast the products to the program he developed.

Gary Hoffman, a lawyer specializing in intellectual property rights with the Washington, D.C.-based firm Dickstein, Shapiro and Morin, said that, if the case is tried on more than the statute of limitations, it will involve "look-and-feel" issues such as those in the recent Lotus Development Corp. case against Paperback Software International.

The June decision on the Lotus Development Corp. look-and-feel copyright infringement suit "significantly expanded the law and made it easier to show copyright infringement," Hoffman said.

Hoffman said that in the Westinghouse case, it would not be necessary to show that the company copied the source code. Just showing that Westinghouse may have used "the basic concepts, structure and organization behind the program" would be enough to win the case.

If WCS loses, the software ownership reverts to McCann, noted Hoffman, and "Westinghouse would have to tell users the license is null and void."

See The FAXNeT Form on Page #26

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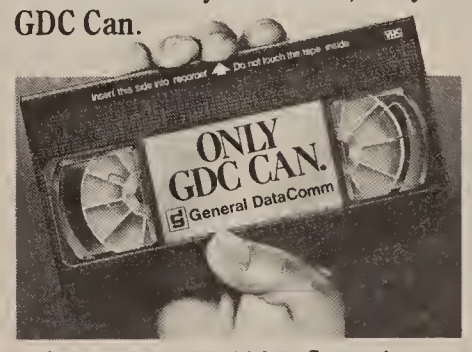


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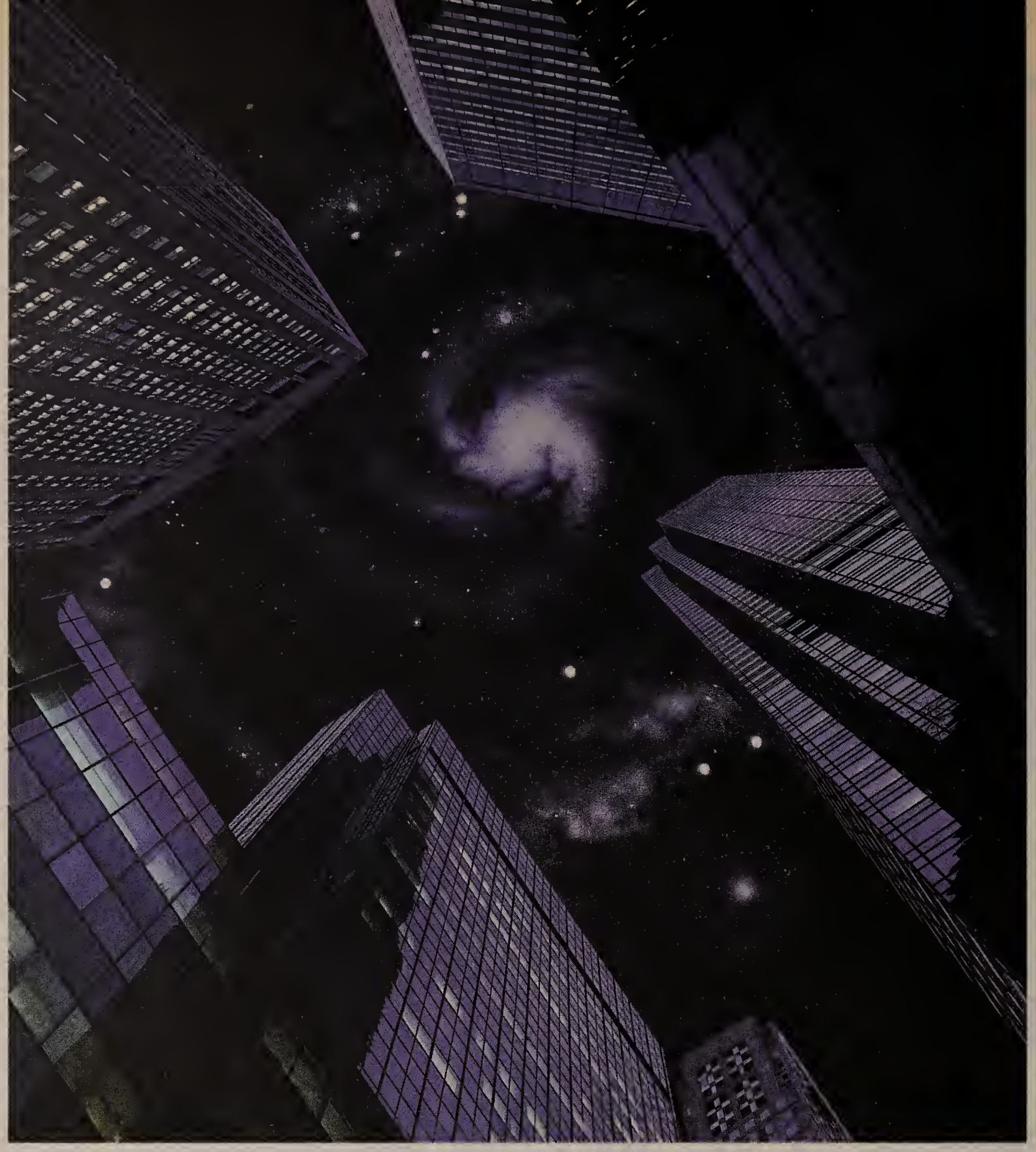

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See The FAXNeT Form on Page #26

## Worth Noting

Rolm Co., an IBM and Siemens AG company, recently cut over its 500th 9751 CBX Model 10, a switch installed at the headquarters of CI Travel, a national travel agency in Norfolk, Va. Rolm unveiled the Model 10 in August 1989 and four months ago began shipping the switch, which can support as many as 600 lines.

## Carrier Watch

**VoiceCom Systems, Inc.,** a voice processing service provider in San Francisco, recently introduced Bank by Phone, an interactive service for banks that lets customers use their phones to perform routine tasks such as inquiring about account balances.

VoiceCom said financial institutions will find the service less expensive than buying customer premises equipment and software, and adding the staff necessary to offer similar services.

VoiceCom will develop applications, manage data bases, train staff how to use the offering, generate service usage reports and perform ongoing management and support for companies that subscribe to the service.

**MCI Communications Corp.** last week said it has signed a three-year, $30 million long-distance service contract to provide long-distance services to **Prime Motor Inns, Inc.,** a hotel management firm in Fairfield, N.J.

Under the agreement, MCI will carry collect, third-party, person-to-person and credit card calls from guest rooms and pay phones at 133 Prime Motor Inn locations. MCI will also provide the hotel management company with MCI 1 Plus Services, Prism Plus and a customized MCI Card.

# New Rolm switch software to arrive 4 months early

Firm says Release 9005.1 to debut in August.

By Bob Wallace
Senior Editor

NORWALK, Conn. — Rolm Co. last week announced that the latest version of the operating switch software for its 9751 CBX private branch exchange will be available Aug. 31, four months ahead of schedule.

The software, Release 9005.1, will support an array of new enhancements, including automatic number identification (ANI) and Integrated Services Digital Network offerings.

Announced a year ago, Release 9005.1 will be available for Rolm 9751 CBX Models 10, 40 and 50 by the end of next month and for the high-end Model 70 in January 1991.

The software supports two ANI features, ANI Call Processing and ANI Call Routing. ANI Call Processing passes ANI to Rolm display phones, Rolmphone 240E, Rolmphone 400 and Cypress sets, as well as to host computers linked to Rolm 9751s using IBM's CallPath or Rolm's CallBridge PBX-to-host software.

ANI Call Routing enables users to build call routing software tables containing as many as 10,000 numbers. Each number can be assigned to an extension or an automatic call distributor (ACD) group.

Release 9005.1 will also enable the 9751 CBX, when used with the Rolm 9757 ISDN Adapter, to use AT&T's ISDN Primary Rate Interface service and MCI Communications Corp.'s 800 Enhanced Services Package, an in-band ANI offering.

The software is required for the recently announced Rolm 9030A CPU, which increases the switch's busy-hour call attempts from 11,000 to 30,000.

Release 9005.1 also boosts the number of ACD agents the 9751 CBX can support from 200 to 500 on the Model 40 and Model 50 as well as on each node of the high-end Model 70. The software increases the number of agents supported per node for CallPath from 180 to 400 on Models 40, 50 and 70. It also increases the number of lines supported from 2,000 to 3,750 per node for Models 40 and 50.

## WASHINGTON UPDATE

BY ANITA TAFF

**AT&T takes another stab at Tariff 15.** AT&T recently filed its ninth service plan under Tariff 15, this one for Schwan's Sales Enterprises, Inc., a Marshall, Minn.-based manufacturer and distributor of frozen foods. AT&T is offering the company a 13% discount on Software-Defined Network (SDN), a 7% discount on AT&T World Connect calls and an 8% discount on Megacom 800, basic 800 and 800 Readyline.

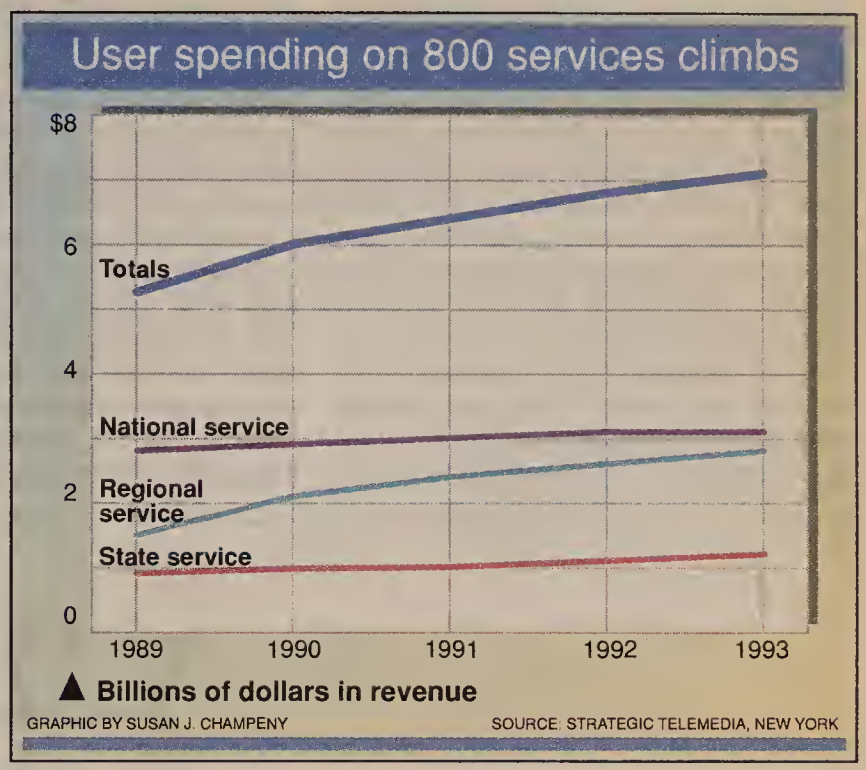
AT&T's Tariff 15 has been controversial from the start, and many customer deals have been delayed or rejected by the Federal Communications Commission. To reduce the risk for users, AT&T is now building special discounts into Tariff 15 deals to compensate for potential regulatory delays.

The four-year deal with Schwan's is scheduled to take effect Sept. 3, but if installation is delayed beyond Oct. 18, AT&T will give the firm credits on service. If the deal takes effect between Oct. 18 and Nov. 18, the company will receive a onetime credit equal to 13% of their first bill on SDN, an 8% credit on 800 services and a 7% credit on World Connect. The credits range up to 65% for SDN, 40% for 800 services and 35% for World Connect if it is delayed beyond Feb. 18, 1991.

In its filing, AT&T told the FCC that MCI Communications Corp. had made a similar offer to Schwan's and that the customer was going to switch if AT&T did not make a counteroffer.

AT&T claims MCI was offering a special off-tariff rate on a four-year deal for Vnet, Vnet Global Value Plus, Global Value Plus Canada, 800 Business Line and basic 800 services.

AT&T is providing service under Tariff 15 to only one customer, Resorts Condominium International, Inc. AT&T has filed eight other Tariff 15 deals but has not been allowed to provide service under any of them.




# AT&T service helps broker shave costs

Schwab builds telephone trading service using equipment in AT&T net instead of buying CPE.

By Bob Wallace
Senior Editor

SAN FRANCISCO — Charles Schwab & Company, Inc.'s use of AT&T's InfoWorks voice processing offering has enabled the nation's largest discount broker to speed the launch of a new telephone trading service.

Schwab's TeleBroker, introduced last fall, enables customers to use their push-button phones to trade stocks and securities, get stock quotes and check account balances.

The service is supported from InfoWorks equipment within AT&T's network. The offering enables users to build voice processing applications into the AT&T network instead of using customer premises equipment.

Besides limiting the time required to launch TeleBroker, Schwab Senior Product Manager Elizabeth Wilcox estimates the firm will save "millions of dollars over the next several years" by building TeleBroker on InfoWorks instead of adding staff and buying equipment and software.

By automating trading and other simple inquiries, TeleBroker has also enabled the company to off-load calls from branch offices and handle unpredictable trading spikes without adding staff or opening new branches. Spikes, which are caused by major stock market shifts, can boost trading volume by as much as 35% in a single day.

"We began looking at this application after the [1987] stock market crash," Wilcox said. "We needed a way to add delivery points to our customer base with immediacy but without adding brick and mortar and staff."

TeleBroker currently handles 3% of Schwab's trades, a percentage that is expected to soar to 20% in the near future. Without TeleBroker, Schwab estimates it would have had to open three new branch offices to handle increases in trading.

TeleBroker also helps Schwab reach a segment of its customer base that was not using on-line trading services.

"We desperately needed an automated trading service to pull in the huge number of Schwab customers that didn't have a personal computer at work or at home. TeleBroker fit the bill," said Carolyn Stewart, Schwab product manager.

TeleBroker complements Equalizer, Schwab's on-line trading, stock quote and information service for customers with IBM Personal Computers, and GEnie, a similar offering for Apple Computer, Inc. Macintoshes and other microcomputers.

To use TeleBroker, customers dial (800) 2SCHWAB and are routed by area code to AT&T's Enhanced Service Complex (ESC) platform either in New York or San Francisco. The caller is greeted by an AT&T Conversant voice response system and asked to key in an account number and password.

The codes are sent over an IBM Systems Network Architecture link to an IBM mainframe at Schwab's corporate headquarters

*(continued on page 14)*

## AT&T service helps broker shave costs

*continued from page 13*

here and checked against customer records. If both codes are accepted, the mainframe sends an approval to the AT&T Conversant System, which then uses speech synthesis to read the TeleBroker menu to the caller. The system prompts callers to press 1 to place an order, 2 for a stock quote, 3 for an indicator, which is a quote on an entire market, and 4 for an account balance. Callers can hit other keys to change their password.

If callers press 1, they are asked if they wish to buy or sell. Then the system prompts callers to enter a six-digit code for the company's stock symbol. Customers can then place a market order, which instructs the firm to buy or sell the stock immediately, or a limit order, which instructs Schwab to buy or sell the stock when its price reaches a level keyed in by the user.

After each transaction is processed, the Conversant system reads an order number to the callers that they can use to check the order's status at a Schwab branch office later on. Once an order is executed, the branch calls the customers to let them know the order went through.

Besides making Schwab services available to a broader audience, TeleBroker frees up time for the company's 30 to 40 agents here to work with customers on more complex transactions, Wilcox said.

Stuart Watson, manager of systems engineering for Schwab, said, "The flexibility of InfoWorks will allow Schwab to refine and expand TeleBroker relatively quickly in response to market feedback."

The brokerage preceded the rollout of TeleBroker with a direct mail campaign introducing the new service. "We went from no subscribers in September to 15,000 at the end of April," Stewart said.

Schwab is readying another direct marketing program targeting customers of competitors.

TeleBroker is available to roughly half of Schwab's market area today. It was introduced to customers in the San Francisco Bay area in October; New York in November; Chicago and Washington, D.C. in December; Los Angeles, Seattle and Texas in January; and Florida and Georgia shortly thereafter.

## MCI responds to AT&T rate hike with increases

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — MCI Communications Corp. proposed an average 2% rate increase for a wide variety of its switched services in a recent Federal Communications Commission filing.

The changes, which are scheduled to take effect this week, cover MCI's Prism I, II and III services, Prism Plus, MCI WATS, Hotel WATS and its Vnet virtual network offering.

The rate hikes come on the heels of a 2% increase proposed by AT&T for its Software-Defined Network service, Megacom WATS and Pro WATS offerings in a July 14 FCC filing.

MCI's Prism Plus service is priced by eight mileage bands. A 0- to 55-mile daytime call would rise from 18.72 cents to 19.11 cents a minute, while a 4,251- to 5,750-mile daytime call would increase from 22.48 to 24.77 cents a minute.

MCI raises Virtual Network rates

| Access facilities | Cost per minute | | |
|---|---|---|---|
| | Old rate | New rate | Change |
| Switched to switched | $.1750 | $.1786 | 2.0% |
| Switched to dedicated | $.1301 | $.1328 | 2.1% |
| Dedicated to switched | $.1365 | $.1392 | 2.0% |
| Dedicated to dedicated | $.0916 | $.0934 | 2.0% |

SOURCE: MCI COMMUNICATIONS CORP., WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

MCI's Prism 1 service is priced using five mileage ranges. A short-distance daytime call in the lowest band (Range 1) would rise from 11.25 to 11.48 cents a minute, while a long-distance Range 5 call would increase from 17.06 to 17.40 cents a minute.

Prism II is also priced using five ranges. The rate for a Range 1 daytime call would increase from 14.35 cents a minute to 14.65, while the rate for a Range 5 daytime call would increase from 19.18 to 19.60 cents per minute.

MCI said rates for Prism III service and MCI WATS would increase by about 2%.

The carrier's Hotel WATS service is priced using 18 rate steps. At the first step, per-hour rates for 15 hours of usage would increase from $11.08 to $11.32. At the highest step, rates for 15 hours of usage would increase from $14.83 to $15.13 per hour.

The carrier also proposed raising Vnet rates by as much as 2.1% (see chart).

An MCI spokeswoman said the carrier will match future AT&T rate increases.

According to Daniel Briere, president of TeleChoice, Inc., a consultancy in Manchester, Conn., "AT&T is not afraid to start gradually raising rates because they realize there is less competition in the long-distance market."

"And as AT&T raises rates, MCI and [US Sprint] will follow," Briere added.

# DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT


## Worth Noting

"It is no longer acceptable to force the user to know where the data is on a network and make them get it. The network must be smart enough to do that and do so transparently to the user."

**Mark Rakhmilevich**
AIX/370 system architect
IBM
Speaking at the recent Engineering Workstations Conference in Boston

## Data Packets

**T3plus Networking, Inc.** recently introduced a data service unit (DSU) that enables users to link data terminal equipment (DTE) directly to a T-3 circuit.

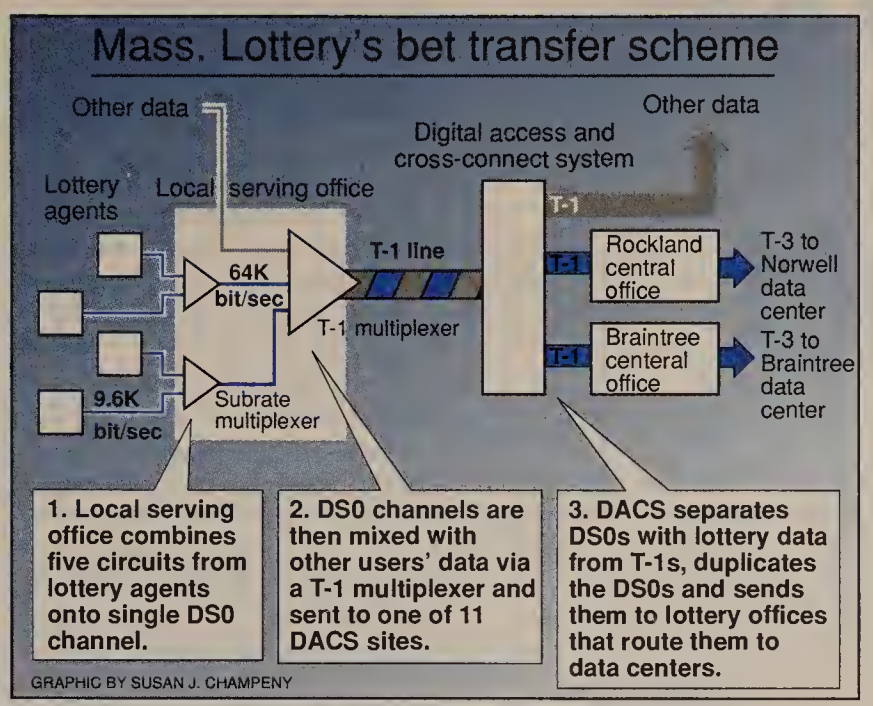
The DSU45 supports a single communications channel between such devices as workstations and local-area network bridges at up to 44.210M bit/sec, the available bandwidth of a T-3 circuit.

Currently, most data communications equipment supporting T-3 only works with channelized data inputs such as T-1 or 64K bit/sec DS0 data streams.

The DSU45 can be programmed to accept data from DTE at speeds ranging from 3.158M bit/sec to 44.210M bit/sec using a High Speed Serial Interface board. The DSU45 uses the remaining bandwidth to create a T-3 signal that meets AT&T and ANSI standards and can be transmitted over private or public fiber and microwave facilities.

T3plus also supplies a microcomputer-based package to manage DSU45s. The microcomputer running Supervisory Software is linked to the DSU45 via RS-232. With the software, users can configure DSU45s and monitor T-3 circuit performance.

The DSU45 and Supervisory Software are available now. The DSU45 costs $12,500, and the Supervisory Software sells for $1,000.




# Bypass threat spurs carrier to offer user new service

Mass. lottery officials relish benefits of DDS II.

**By Jim Brown**
Senior Editor

BRAINTREE, Mass. — Massachusetts State Lottery officials recently said plans to expand the department's private bypass network prompted New England Telephone and Telegraph Co. to offer a new digital data service (DDS) that costs roughly the same as analog leased lines.

The lottery currently uses 451 multidrop analog leased lines as well as private microwave service and a private data radio network that bypasses New England Telephone to link terminals in 5,600 lottery agent locations to its data center here. It had planned on expanding the use of private data radios until New England Telephone developed its new DDS II and offered the lottery a 15-year contract for the service.

"The bottom line is, we could provide alternative service, and New England Telephone knew it," said Lou Demas, manager of microwave and radio systems for the lottery. He said New England Telephone's proposal was clear: If the lottery abandoned plans to install 1,600 more radios, the carrier would offer it a digital service at a price it couldn't refuse.

"I think the product was on the drawing board anyway, but the lottery situation may have hastened its arrival," said Jim Kehoe, lottery account manager with Nynex Corp.'s systems marketing division.

New England Telephone tariffed DDS II in June 1989 and asked the lottery to beta-test it. The service offers line speeds up to 19.2K bit/sec.

For the lottery network, the carrier bundled all necessary equipment, transmission facilities and installation needed to link terminals at lottery agent locations to a data center here and to a disaster recovery site the lottery will build in Norwell, Mass.

After a successful test that ended earlier this year, the lottery signed a contract last month calling for 5,200 lottery agent locations to use DDS II at a monthly cost of roughly $41 per agent location.

> If the lottery abandoned plans to install 1,600 more radios, the carrier would offer it a digital service at a price it couldn't refuse.
>
> ▲▲▲

The price for existing analog service is about $35 per agent location, but New England Telephone said those analog charges will be going up over the years, while DDS II costs for the lottery will remain relatively constant.

In fact, Demas said the only part of DDS II costs that can increase over the 15-year period is a monthly maintenance fee that covers New England Telephone's equipment and labor costs. Currently set at $7 a month per agent site, the fee cannot increase faster than the annual increase in the consumer price index.

In addition to the cost benefits, DDS II will improve network reliability and performance because it is less error-prone than analog services. This will help the lottery continue to keep total transaction time to within four

*(continued on page 16)*

# Utilities glow over meter network tests

Three users report success of radio-based meter reading nets; all plan to expand scope of trials.

**By Paul Desmond**
Senior Editor

BOSTON — Utilities on both the East and West coasts are making headway with tests of radio-based networks that carry diagnostic and control data for electricity distribution systems, enabling a bevy of new billing and service options.

Three utilities — Boston Edison Co., Pacific Gas & Electric Co. (PG&E) and Southern California Edison Co. — have been testing the nets for at least a year ("Meter nets may change utility bills," *NW,* July 24, 1989).

Since then, Southern California Edison has successfully demonstrated the nets' ability to collect accurate customer usage data according to the time of day, as well as to broadcast signals that control thousands of remote devices and allow service crews to access the net from laptop computers in their trucks.

Boston Edison, meanwhile, is charting new waters by using the system to monitor and control underground electrical circuits. PG&E, which already successfully tested its net for electricity customers, is planning a trial of the net for both electricity and gas customers. A fourth utility, Florida Power & Light Co., will begin installing equipment in August for its trial.

All four utilities are using equipment from Metricom, Inc. of Campbell, Calif.

The equipment includes packet radios that usually sit atop utility poles and use spread-spectrum radio technology to communicate with one another. The radios are linked via power lines to Metricom meters attached to customer homes or business locations. The meters transmit usage and diagnostic data over the power lines to the radios, which then broadcast it to central data collection sites.

In addition to supporting automated meter reading, the nets represent the first attempt at automating power distribution

*(continued on page 48)*

# *Ameritech offers low-cost sub-T-1 digital data service*

**By Ellen Messmer**
Washington Correspondent

CHICAGO — Ameritech recently introduced a digital data service it said is a less expensive alternative to its existing Direct Digital Services.

Ameritech officials said the company's new Optinet Services will offer a range of sub-T-1 transmission speeds, from 2,400 to 56K bit/sec. But the real advantage of the service to users is that they no longer have to run a link from their premises to a central office for hubbing purposes.

Previously, those restrictions made the service expensive and sometimes resulted in awkward back-hauling of traffic between end points, said Sue DeFlorio, Ameritech's Direct Digital Services product manager.

Instead, Ameritech plans to phase in a series of local wiring centers with digital access and cross-connect systems (DACS) and D-4 channel banks that will multiplex data onto a T-1 link and route it to a wiring center near its destination, where the data will then be split off and delivered.

Optinet Services includes the same speeds of 2,400, 4.8K, 9.6K and 56K bit/sec offered with Direct Digital Services, but Ameritech said it also added an optional 19.2K bit/sec speed.

Bill Funk, Ameritech's director of Optinet Services, said, "Optinet utilizes DACS systems in the subrate speeds. That gives us the ability to make the services more widely available to end-user locations because it is not dependent on the existence of [Direct Digital Services] hubs."

According to DeFlorio, the introduction of Optinet Services signals the start of a major network upgrade that will expand the availability of Direct Digital Services.

Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C. consulting firm, said the network upgrade is long overdue.

"The reason they haven't done that in the past is it costs them money. They haven't been responsive to customer demand," Dzubeck said.

*(continued on page 16)*

## Bypass threat spurs carrier

*continued from page 15*

seconds. That time includes the time it takes to enter a bet, send it to the host and print a lottery ticket.

**Better response time**

While the lottery will keep its terminal-to-host throughput speed at 1,800 bit/sec, DDS II will actually decrease terminal-to-host response time by a few milliseconds by reducing the amount of data that has to be retransmitted due to errors caused by poor analog line quality, Demas said. "Even an improvement of milliseconds ensures that the overall four-second transaction response time is not exceeded."

Even though DDS II supports higher speeds, the lottery is sticking to 1,800 bit/sec to avoid changes to its on-line betting application, which currently runs on an aging Sperry Corp. V-77 minicomputer that will be replaced next year.

The lottery is also planning to add a disaster recovery center in Norwell that will process transactions if the data center here fails. That disaster recovery center will be linked into the lottery's DDS II network.

To provide DDS II, New England Telephone will equip 5,200 lottery terminals with an Integrated Network Corp. (INC) Universal Data Voice Multiplexer (UDVM). Agent locations will be linked via two-wire 9.6K bit/sec multidrop digital circuits to a central office (see graphic, page 15).

Due to distance limitations inherent in the UDVM, those central offices can be no more than 3.4 miles away. Agent locations beyond that distance will be equipped with an INC data service unit/channel service unit and a more expensive four-wire digital circuit.

The UDVM can transmit both voice and data on the same circuit. But since many lottery agents are independent businesses, the state decided not to allow nonlottery voice services to ride over the circuits, Demas said.

Lottery terminals pass data at 1,800 bit/sec to the UDVM, which then uses an INC proprietary technique to fill the rest of that 9.6K bit/sec circuit with phantom data.

The central office receiving the data from the UDVMs uses subrate data multiplexers to merge up to five 9.6K bit/sec circuits onto a single 64K bit/sec DS0 channel. That DS0 is mixed with DS0s from other users served by that central office on a T-1 circuit that goes to one of 11 central offices equipped with a digital access and cross-connect system (DACS).

The lottery is also planning to add a disaster recovery center in Norwell, Mass.

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The DACS extracts DS0s carrying lottery data from multiple incoming T-1s and creates a duplicate copy. One copy of the data is sent via a dedicated T-1 to a central office in Braintree, while the other copy is sent via a dedicated T-1 to a central office in Brockton, Mass.

The Braintree and Brockton central offices multiplex incoming T-1 traffic onto T-3 circuits. The Braintree central office ships data over a T-3 link to the data center here, while the Brockton central office will ship data over a T-3 link to the Norwell data center, which will be built next year.

At the data centers, the T-3 is demultiplexed to individual 9.6K bit/sec channels that are fed to UDVMs at the data center. The UDVMs strip away the phantom data and feed individual 1,800 bit/sec channels into the V-77.

## Ameritech offers service

*continued from page 15*

Although Dzubeck called Ameritech's DACS-based system an improvement, he said it was essentially only an interim solution. He said the final solution is to upgrade the wiring centers, which are often analog, to handle ISDN Primary Rate Interface.

Rates for Optinet Services will be uniformly priced across the regions of the five Ameritech operating companies, as opposed to the disparate Direct Digital Services prices in each region.

Ameritech said the new Optinet Services pricing will save customers between 10% and 40% over current Direct Digital Services rates. Ameritech is offering Optinet Services on a one-month, one-year, three-year and five-year basis.

Ameritech also said it is folding its T-1 and T-3 services into the Optinet Services line.

State and federal approval of the new service is expected late next month. Ameritech will continue to support current Direct Digital Services customers.

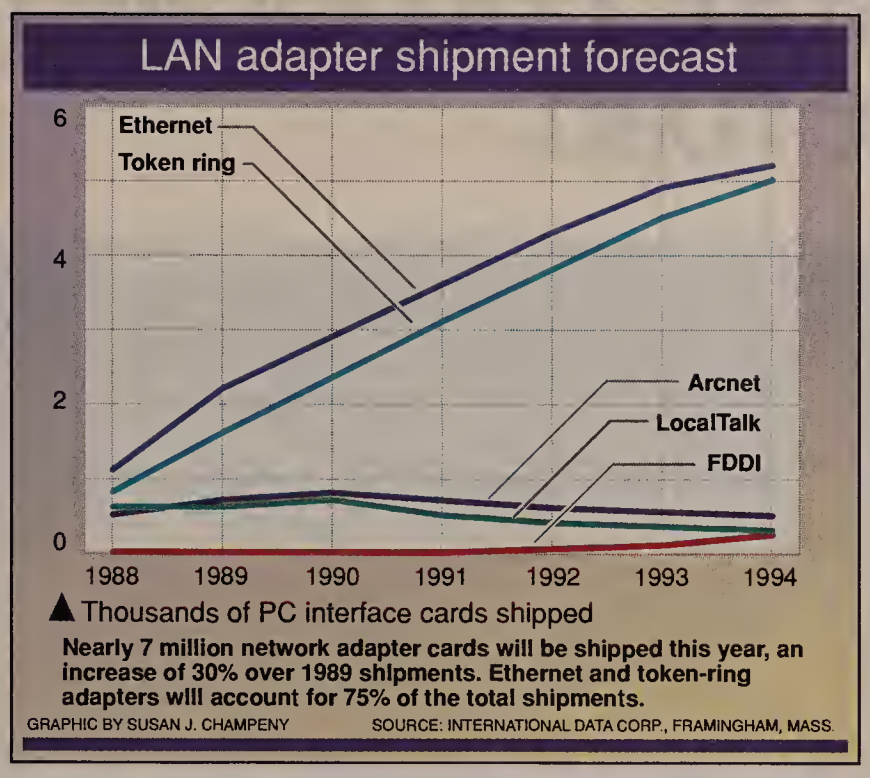
Wade Bent, MCI's senior product manager of product marketing for the Midwest Division, said he welcomed the Optinet Services announcement.

"We think it's good news. It gives us more access options for customers. Before the announcement, customers could only subscribe to analog access, or high-cost [Direct Digital Service] or T-1 access. There was nothing that could give the customer low-cost access," Bent said.

## Worth Noting

"In order for NetWare 386 to really succeed, Novell should price it so that everyone can afford it. The $8,000 price tag is too high for most of the industry, especially for small and midsize LAN users with fewer than 20 nodes, who account for the majority of NetWare's installed customer base."

**Craig Burton**
Editor
*The Clarke Burton Report*
Provo, Utah




# Vendors form virus prevention squads

Recent number of network OS-specific viruses lead Novell, others to build security task forces.

**By Laura DiDio**
Senior Editor

FRAMINGHAM, Mass. — Vendors are quietly responding to the threat posed by the latest spate of network-specific viruses by forming security teams to dissect the bugs and develop deterrents that can be embedded in their local-area network operating systems.

These proactive measures by such companies as Novell, Inc. and AT&T are, in part, a direct response to new strains of viruses capable of bypassing the inherent security of DOS- and OS/2-based network operating systems such as Novell's NetWare and Microsoft Corp.'s OS/2 LAN Manager.

As one might expect, IBM is best equipped to take counteroffensive measures against computer viruses. The company examines all the known strains of bugs at its High Integrity Computer Lab at Thomas Watson Research Center in Yorktown Heights, N.Y.

But virus testing by network operating system vendors such as Novell and AT&T is a fairly new phenomenon.

Richard King, vice-president of software development at Novell, said the company "takes the virus threat very seriously."

Novell has instituted an in-house laboratory to analyze known viruses and has embarked on a campaign to make its own employees aware of the potential threat these infections pose by posting guidelines about safe computing practices.

King said that in addition to analyzing and testing viruses in-house, Novell is also working on a

*(continued on page 20)*

# Terminal server for wiring hub saves on space, costs

Hughes product works with several concentrators.

**By Susan Breidenbach**
West Coast Bureau Chief

MOUNTAIN VIEW, Calif. — Hughes LAN Systems, Inc. recently introduced a line of terminal servers that plug directly into intelligent wiring hubs from Cabletron Systems, Inc., Chipcom Corp. and SynOptics Communications, Inc.

The LINC/Term Hub series of modules are full-function asynchronous terminal servers that fit inside a wiring concentrator chassis. This provides both cost and space savings by eliminating the need for a separate terminal server enclosure with its own power supply.

Each module supports eight RS-232 serial devices — including terminals, modems and printers — and the number of modules that can be put in a single concentrator is limited only by the number of available slots. Mixing the LINC/Term modules with personal computer modules enables users to employ a single Ethernet unshielded twisted-pair cabling plant for both LAN and terminal-to-host connections.

"The Hughes LINC/Term module is a clean, cost-effective alternative to installing external servers in our already crowded wiring closets," said Leonard Nielson, a data communications analyst in charge of computer networks at Evangelical Health Systems, Inc., which owns and operates five hospitals in the Chicago area.

"This product represents an important step toward seamlessly integrated wiring hub solutions," Nielson added. There are already efforts under way to integrate bridging and routing functions into intelligent hubs.

Like the rest of Hughes' LINC/Term terminal servers, the new LINC/Term Hub series machines run terminal server operating software that provides simultaneous support of TCP/IP Telnet, Digital Equipment Corp. Local Area Transport and Hughes LocalNet protocols. Users can hot-key between multiple host sessions established over any mix of protocols.

The modules can be purchased with the operating software already installed in read-only memory. However, users can also buy the modules without the ROM and download the software across the network from a server, thus facilitating software upgrades.

**Net management**

Network management features enable multilevel security and access control, and provide for remote command and diagnostics. The modules also include Simple Network Management Protocol (SNMP) agent software so that an SNMP management station can query, configure and receive alerts from them.

The LINC/Term 3208 module is designed for SynOptics' LattisNet System 3000, the LINC/Term TSRV-8 plugs into the Cabletron Multi Media Access Center, and the LINC/Term 5208 is designed to work with Chipcom's ONline concentrator. The modules are priced at $1,395 each and are expected to be available in August.

For more information, write to Hughes LAN Systems at 1225 Charleston Road, Mountain View, Calif. 94043, or call (415) 966-7300.

## Netnotes

**Storage Dimensions, Inc.** recently announced a write-once, read-many optical storage subsystem that provides 940M bytes of storage to users on local-area networks running Novell, Inc.'s NetWare.

The LANStor Write-Once Optical drive is installed on a dedicated DOS-based workstation attached to the NetWare LAN. It comes with Storage Dimensions' ShareMaster software, which provides the NetWare link via NetWare's native Internetwork Packet Exchange (IPX) protocol and lets as many as 200 users access data from the subsystem simultaneously.

The LANStor drive comes with a Small Computer System Interface controller for either an AT-compatible or Micro Channel Architecture (MCA)-based machine, plus cables and one 940M-byte data cartridge.

The LANStor LNW1-900S1 for AT-class machines costs $4,395, and the LNW1-900S1PS for MCA-based systems costs $4,745. Additional 940M-byte data cartridges are available for $160.

Contact Storage Dimensions at 2145 Hamilton Ave., San Jose, Calif. 95125; (408) 879-0300.

# *Insidious Stealth virus can elude detection*

As if the Jerusalem, Pakistani Brain and Ping-Pong viruses weren't enough to give users ulcers, a new breed of bug called Stealth viruses has cropped up.

The viruses, which take their name from the Stealth bomber, are designed with the express purpose of evading detection.

Unlike prevalent bugs such as the Jerusalem virus, which alerts users to its presence by enlarging files and gobbling up precious system and network resources, Stealth viruses are deadlier because they often do their dirty work undetected, according to Harold Highland, editor emeritus of *Computers and Security* magazine.

Some Stealth viruses are so sophisticated, they can remove themselves from a program once they have infected it if the file or program is called by a virus antidote.

The most publicized example of the new Stealth virus is the 4096 PC virus, which is allegedly set to be triggered on Sept. 22, the birth date of Frodo Baggins, the protagonist in J.R.R. Tolkien's novel *Lord of the Rings*. Like the Jerusalem virus, the 4096 PC virus is aimed at DOS-based systems and LANs with DOS clients. The 4096 PC virus, which displays the message "Frodo Lives" when triggered, can erase files from the system or server's hard disk, and can also prevent local systems and servers from booting.

So far, 4096 PC has shown up at several universities around the country, as well as more than a dozen Burger King restaurants in California and several Internal Revenue Service offices in Seattle, according to John McAfee chairman of the Computer Virus Industry Association in Santa Clara, Calif.

**Virus threat still looms**

While neither the improved strain of the Jerusalem virus, which recently surfaced and appears to target NetWare LANs, nor the nascent 4096 PC virus have caused any major mishaps, the threat is still very much alive according to virus experts.

"Users can't afford to let their guard down for a second because you never know when a virus will strike or what form it will take," said Jon David, an independent security consultant in Tappan, N.Y.

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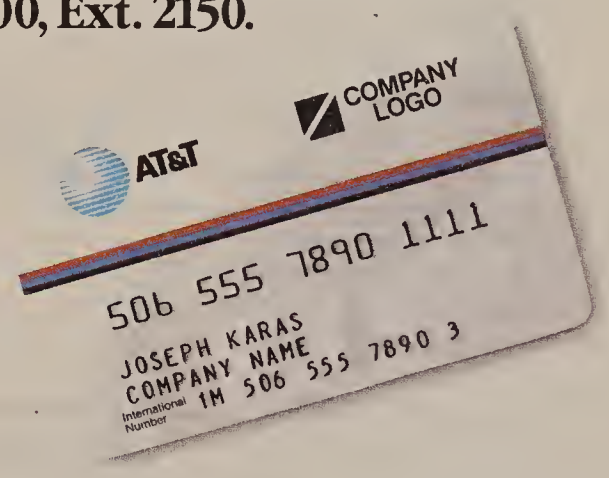


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# Vendors form virus prevention squads

*continued from page 17*

Virus Checker NetWare Loadable Module (NLM) for NetWare 386 that will enable users to scan copies of the NetWare software to ensure integrity.

Each copy of NetWare 386 will contain a coded digital signature that will be inputted into a central Novell data base, King said. Once users receive the Virus Checker NLM, they can use it to scan existing copies of NetWare and verify that the NetWare server and personal computers attached to the LAN are virus-free.

"We're hard at it, and I hope the Virus Checker NLM isn't more than a year away," King said. "I'm just sorry that we couldn't include the Virus Checker in the NetWare NameService NLM due out this quarter."

Novell is committed to putting both its engineering and monetary resources toward halting the spread of viruses. In fact, the company spent an undisclosed amount of money to license public data encryption technology from RSA Data Security, Inc. in Redwood City, Calif.

Novell is among the first network operating system software vendors to endorse public key cryptography, which makes it hard for outsiders to gain unauthorized access to systems and networks.

Digital Equipment Corp. and Lotus Development Corp. also have licensing deals with RSA.

King said he is hoping that the addition of an NLM based on RSA's public key encryption technology will help protect against viruses such as the new strain of the Jerusalem virus that appears to be specifically targeted at NetWare.

Earlier this month, alarms were sent out over NetWire, the NetWare users' bulletin board, and by Carnegie-Mellon University's Computer Emergency Response Team, warning that a NetWare-specific virus had been discovered.

The virus is capable of circumventing the System Fault Tolerant security features of NetWare Version 2.15 ("Jerusalem virus variant plagues NetWare security," *NW,* July 23).

The new virus has thus far been reported only on NetWare LANs; however, other network operating systems such as Banyan Systems, Inc.'s VINES, Microsoft's LAN Manager and IBM's PC LAN server are also vulnerable to attack.

A Banyan spokesman said that thus far, the company has received no reports of Jerusalem virus infections on any VINES network.

**Unix: natural virus immunity**

AT&T, which manufacturers a Unix-based version of Microsoft's LAN Manager, also has an internal computer security group devoted to dissecting viruses to catalog their effects.

The security group passes on its findings to AT&T software developers to enable them to build defenses into its Starlan Group LAN Manager Unix offering to thwart viruses.

But engineers at AT&T Bell Laboratories' Middletown, N.J., facility say the Unix base of LAN Manager Unix provides some inherent defenses.

"Our LAN Manager Unix offers users a higher degree of protection against the normal viruses since it's much tougher to breach Unix security — which incorporates inherent logon security — than it is to get past DOS and OS/2, which don't have built-in security features," said Joe McCormick, a member of the technical staff in AT&T Bell Labs' computer networking laboratory.

A Banyan spokesman said that thus far, the company has received no reports of Jerusalem virus infections on any VINES network.

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"The Internet Worm found the last unguarded back door into Unix," McCormick said. He acknowledged that AT&T's Starlan Group LAN Manager Unix cannot prevent a virus from infecting individual client workstations or files in the server directory to which the user has access rights. "But we can stop these new network-specific viruses because of the way we implement LAN Manager security through Unix," McCormick said.

According to McCormick, viruses seeking to penetrate AT&T's Starlan LAN Manager Unix networks are confronted with two obstacles.

"First off, the virus would have to find a way to access the Unix-based server. Even if it managed to accomplish that, the virus would still have to obtain super user access privileges to enable it to invade the network file system for the purpose of enlarging files, deleting files and generally wreaking havoc," McCormick said.

Like IBM, AT&T also has an internal computer security organization that monitors and analyzes viruses, and sends out updates on new viruses to its engineers.

"Our internal computer security organization tells us the properties of the virus and how it works so that we can focus our tactics on building roadblocks to viruses at the server," McCormick said. "Every time we sit down to write code, we're constantly thinking of different ways to put in more safeguards because viruses aren't going to go away and no system is impregnable."

## Worth Noting

"After implementing a virtual voice network, I felt so comfortable about the quality and reliability of our network that I took the cellular phone out of my car."

**Stanley Welland**
Manager of corporate telecommunications
General Electric Co.
Fairfield, Conn.

## Association Watch

The **Southeastern Telecommunications Association (SETA)** recently announced that its membership roster now includes the **West Virginia Telecommunications Association (WVTA).**

WVTA decided to join SETA in order to allow its members to attend SETA conferences and broaden their contacts with other users, according to Park Chapman, president of WVTA, which was formed in December 1989 and has 28 members. SETA comprises more than 1,000 telecommunications managers, representing about 500 companies in 10 Southeastern states.

The **Corporation For Open Systems International** and **Protocols Standards & Communication, Inc.** will cosponsor beginning in September a series of seminars on the topics of open systems and interoperability. Protocol Standards & Communication is an educational institution that provides consulting and training on Open Systems Interconnection and network topics.

The initial seminar will cover a range of topics including OSI, Integrated Services Digital Networks and Government OSI Profile. The seminar will be held the week of Sept. 24 in Washington, D.C.

More than 20 additional seminars will be held during the year. For more information, call (703) 883-2755.

# Help desks evolve to meet new demands

Users are hiring more and better trained workers, and equipping them with advanced tools.

**By Wayne Eckerson**
Senior Writer

The growth of networks and the explosion of end-user computing have expanded the role corporate help desks play and necessitated changes in the way they operate.

Companies have increased the size of their help desk staffs, hired more experienced and better trained employees, and outfitted their support operations with more sophisticated network and problem management tools.

More importantly, senior executives have begun to perceive help desks as a vital component in their drive to improve customer service; quality drives should start with internal operations.

"Companies that recognize the importance of customer service are developing help desks that are proactive in addressing and resolving end-user problems," said Ronald Muns, director of The Help Desk Institute, an organization that provides education and training to help desk professionals.

### At your service

Help desk personnel typically field calls from end users who need assistance with a computer or a communications-related matter. The operators log every call and, if possible, try to resolve the caller's problem. If they can't, they assign a technician to handle the problem and then monitor the progress of the repair until work is completed.

But in recent years, the proliferation of personal computers and local- and wide-area networks has increased the number and variety of calls fielded by corporate help desks. To cope with the load, companies are beefing up help desk staffs and reorganizing operations.

Many companies have replaced a variety of function-spe-

*(continued on page 22)*

GUIDELINES

BY BRUCE ELBERT

## Analysis can help identify likely net failure points

Many of the outages that plague networks are preventable. At their root are single points of failure within intelligent devices or high-capacity transmission links. In many cases, network managers can identify these failure points before disaster strikes by undertaking a thorough analysis.

In the 1960s, the National Aeronautics and Space Administration introduced a method to help identify potential equipment and systems failures called Failure Modes and Effects Analysis (FMEA). The principles behind FMEA are rather simple and can easily be adapted for use by network managers.

Here's how net managers can identify potential points of failure:

- Assemble block or flow diagrams for your network to identify the critical connections between links. This helps to pinpoint single elements that can disrupt service. Be thorough because the very item you leave out of the diagram will likely prove to be your Achilles' heel.
- Chart the flow of user traffic through your network using the diagram. Determine how your network will function if any piece of equipment or link should fail. Hold a brainstorming session with your employees so that all the possibilities are considered.
- Minimize the number of communications devices such as multiplexers, packet switches, modems and controllers that are single points of failures. Remember that the software that drives each device could actually be the source of the failure or

*(continued on page 22)*

*Elbert is director of operations for a large communications company and author of several books on telecommunications and information technology.*

Houston Lighting sends more than 60% of its documents via EDI.

# EDI user Houston Lighting accommodates suppliers

Uses conversion to fax for non-EDI companies.

**By Wayne Eckerson**
Senior Writer

HOUSTON — When Houston Lighting and Power Co. implemented electronic data interchange two years ago, it decided to accommodate the communications capabilities of its suppliers, rather than require them to change.

The strategy has enabled the utility to ramp up EDI so fast that today it sends more than 60% of its purchasing documents electronically, saving the company more than a million dollars annually on overhead and inventory costs.

Houston Lighting uses EDI to transmit requests for quote (RFQ) and purchase orders to suppliers that receive the documents either in ANSI X12 EDI format or, if they are not EDI-capable, via their facsimile machine.

The company transmits ANSI X12 documents to its 50 largest suppliers, while it uses Western Union Corp.'s Free Form Conversion service to convert X12 documents into fax messages for 350 other suppliers. About 200 suppliers still receive RFQs and purchase orders through the mail.

"While we realize this is not the perfect way to do EDI, it makes sense for us," said Winston Stein, senior buyer and EDI coordinator at Houston Lighting. "It accommodates our automation efforts and doesn't require our smaller suppliers to revamp their order fulfillment processes just for us."

### Supplier-friendly EDI

Houston Lighting relies on Western Union to provide the flexibility it needs to support the communications capabilities of its suppliers.

The utility transmits RFQs and purchase orders in the form of X12 documents to an electronic mailbox on Western Union's EasyLink value-added network (VAN). Western Union then picks up the documents, converts them to the correct format and delivers them to the appropriate destination.

If the supplier is on the EasyLink network or another VAN, Western Union delivers the X12 document directly to the supplier's mailbox. Otherwise, the document is converted and sent as a fax.

Conversely, suppliers can transmit responses to RFQs to Houston Lighting through EasyLink. However, non-EDI-capable companies must fax documents directly to Houston Lighting, where clerks key them into a host computer.

By year end, Houston Lighting expects to be able to transmit order status requests automatically to EDI- and fax-capable suppliers, Stein said.

### Automated purchasing

EDI has enabled Houston Lighting to do more than just speed up the exchange of orders. By integrating EDI with the firm's mainframe-based purchasing system, Houston Lighting automated its purchasing and inventory replenishment processes. This has saved the company thousands of dollars in inventory and administrative costs.

The first year Houston Lighting implemented EDI, it was able to eliminate three clerical positions and save $200,000 in postage, envelopes, stamps and purchase forms, Stein said. It also significantly reduced inventory levels, saving the company $100,000. In 1991, Houston Lighting expects to save approximately $1 million through reduced inventory levels and the

*(continued on page 22)*

# Help desks evolve to meet new demands

*continued from page 21*

cific help desks with a centralized help desk that troubleshoots problems for thousands of users on corporate backbone networks.

Northern Telecom, Inc., for example, has a help desk that is responsible for taking calls from approximately 40,000 North American employees. The six-person help desk receives an average of 8,000 calls a month and addresses 1,000 different network and systems problems, according to Bob Johnson, coordinator of systems management at Northern Telecom in Ann Arbor, Mich.

While help desks are supporting more end users, they are also being asked to tackle more complex problems.

Help desks were originally established to answer phone calls and dispatch technicians. Now, many companies expect help desks to provide first- and second-level problem management.

Although definitions vary, first-level problem management involves asking callers basic questions about a problem, such as whether their terminal is plugged in.

Second-level problem management involves restarting printers and terminals remotely, using diagnostic tools to view network and application problems, and taking steps to resolve them.

One consequence of the expanding role of the help desk is that companies have been forced to seek higher skilled individuals to staff the desks.

Jim Fahey, manager of customer support and engineering at ICI Americas, Inc. in Wilmington, Del., said that until about two years ago, help desk personnel were not required to have previous data processing or networking experience.

Fahey, who oversees a help desk that handles an average of 4,000 calls a month and troubleshoots problems on the firm's entire backbone network, said the growing complexity of his firm's network has forced him to seek help desk staffers who have experience in data center management or data processing.

But skilled labor can be hard to come by. As a result, many help desk managers

*(continued on page 48)*



# Houston Lighting adapts to suppliers

*continued from page 21*

use of just-in-time delivery, according to Stein.

The Cullinet, Inc. purchasing system, which runs on an IBM mainframe, automatically creates RFQs when stock levels for certain items fall below predetermined levels. The RFQs contain the type and quantity of the item to be ordered, addresses of suppliers of the product and whether the RFQ should be delivered via EDI or fax.

A personal computer that runs EDI translation software from Metro.Mark Integrated Systems, now owned by Sterling Software, Inc., periodically downloads the RFQs from the mainframe, converts them to X12 format and transmits them to the EasyLink mailbox for delivery.

Twice daily, the personal computer downloads files — responses to RFQs or bids — that have been delivered to Houston Lighting's EasyLink mailbox by suppliers. The personal computer then uploads these files to the purchasing system, which evaluates the suppliers' bids, selects a supplier and automatically sends out a purchase order via EDI.

The efficiency with which this integrated purchasing system handles orders has made EDI converts of Houston Lighting's salespeople, Stein said. "Our buyers no longer want to deal with vendors if they're not EDI-capable," he said. "EDI eliminates the need for them to sign, send, track and evaluate orders — hassles that buyers would rather not deal with."

# Analysis identifies likely failure points

*continued from page 21*

bottleneck, not the hardware.

- Select off-the-shelf equipment that has a good record for operating in network applications similar to yours. The most important parameter on which to rate equipment is mean time between failures. You also should examine the performance of your maintenance organization, that is, the mean time to repair.
- Use redundancy and diverse routing to improve the reliability of your network architecture. Backup equipment that can sense a failure and automatically switch on is usually the most effective redundancy scheme.
- Investigate whether your long-haul common carrier has diverse routing to bypass failed links and tie points. In reality, public networks contain single failure points, which cannot be addressed directly by users. Network managers must delve deeply into the carriers' actual architecture in order to properly consider potential failure vulnerabilities.
- Examine the facilities that house network equipment. In major installations, an uninterruptible power supply, which contains battery storage and a DC-to-AC inverter, can maintain service in the event of a power outage or glitch. However, these systems can themselves cause failures because there is almost always a single point of failure where the uninterruptible power supply meets the power feed to the building. The best way around this problem is to provide a manual power bypass switch.

Single points of failure can cripple network operations, but a little foresight and analysis can prevent potential disasters.

# INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION


## Worth Noting

The volume of outbound international switched traffic from the U.S. is increasing by about 20% per year, or three to four times the growth in domestic switched traffic, according to Gregory Staple, an independent lawyer in Washington, D.C. and director of the Telecommunications Forum of the International Institute of Communications in London.

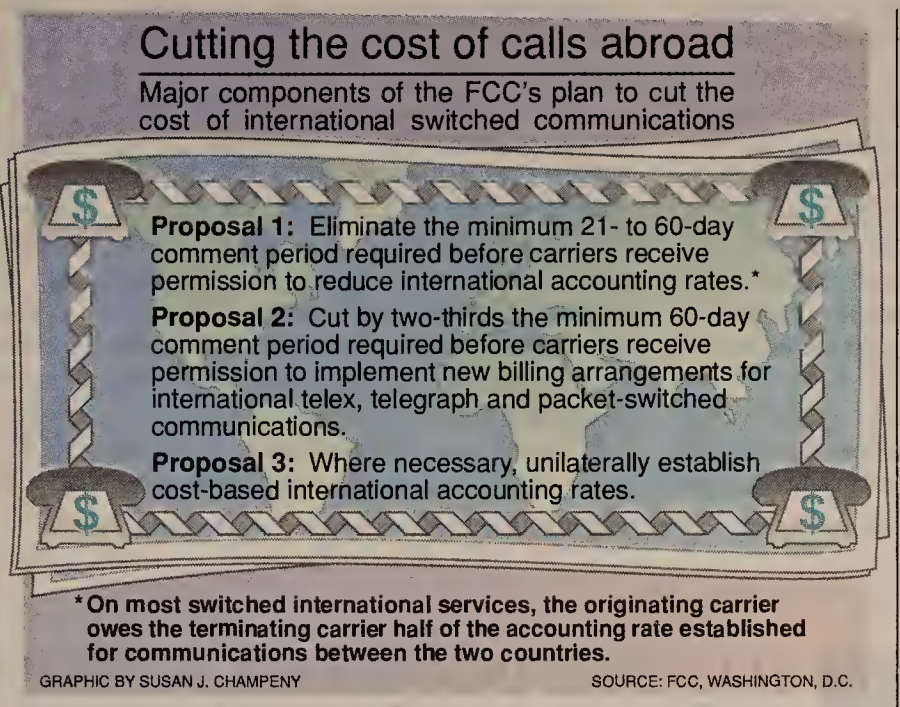
## World News

Value-added net (VAN) service provider and packet-switch maker **BT Tymnet, Inc.,** of San Jose, Calif., plans to announce within the next few months a series of offerings aimed at improving its presence in the international communications market.

Included in the announcements will be new flat-rate pricing plans that will let users with dedicated access to the carrier's VAN send virtually unlimited quantities of data over the facility, according to Ron Bamberg, vice-president of business development and planning at BT Tymnet.

A company spokesman said the announcements may be made in September during the annual conference of the Tele-Communications Association, Inc., a users group in Covina, Calif. Bamberg said the announcements will be BT Tymnet's first major international initiative since it was acquired last year by British Telecommunications PLC from McDonnell Douglas Corp.

Bamberg said BT Tymnet had not been aggressively pursuing international business since the acquisition because it needed to beef up its international staff.




# Some question FCC ability to dictate int'l rate reforms

Observers say FCC may not have legal authority.

**By Barton Crockett**
Senior Editor

WASHINGTON, D.C. — By launching an initiative to lower international switched service prices, the Federal Communications Commission has raised serious questions about its ability to effect major regulatory reforms for services provided in part by foreign carriers.

Claiming that carriers levy charges far exceeding provisioning costs, the FCC earlier this month outlined three specific reforms it would like to adopt to lower the cost of international switched services (see graphic).

At their most fundamental level, these reforms are designed to lower the payments carriers make to one another for terminations of international switched traffic.

The FCC said it believes that reducing these payments will lower costs to carriers, which in turn could reduce user charges and lessen the U.S. trade deficit in international switched services ("FCC takes action to lower international calling rates," *NW,* July 16).

But while most observers agree that reducing international accounting rates could lead to lower prices for users, they caution that the FCC may not have the legal authority to accomplish its aims, since that would entail forcing foreign carriers to cooperate with a U.S. agency.

"That's the million dollar question," said a Washington, D.C. communications lawyer who requested anonymity. "Does an agency of the U.S. government have the authority to dictate settlement terms to a foreign entity?"

The FCC said it is focusing on the matter because it believes artificially inflated accounting rates have contributed to a systematic overpricing of international switched services to users.

Basically, accounting rates are per-minute charges carriers assign to international switched transmissions. Any carrier that originates an international switched transmission owes the terminating carrier half the rate.

> "Does an agency of the U.S. government have the authority to dictate to a foreign entity?"
>
> ▲▲▲

FCC officials allege that foreign carriers are forcing U.S. carriers to accept accounting rates that exceed provisioning costs by as much as 50%. The agency claims that lowering accounting rates will enable U.S. and foreign carriers to cut prices on international switched services.

Moreover, the agency says that reducing accounting rates would trim the massive U.S. trade deficit in switched services, which approached $2 billion in 1988 and has been growing at a 20% clip for the past few years.

This deficit is caused by the fact that more international calls originate in the U.S. than terminate here. Gregory Staple is a lawyer in Washington, D.C. and director of the Telecommunications Forum of the Institute of International Communications, a think tank in London. He said about 7.5 billion minutes of inter-

*(continued on page 25)*

# Global nets elevate security concerns

Experts advise users to police network access closely, use encryption methods to foil intruders.

**By Walter Sweet**
West Coast Correspondent

Net managers of multinational companies based in the U.S. who are bringing up or maintaining an existing international net should be aware of security concerns unique to networks abroad.

International networks pose a number of potential risks to a company, including the possibility that foreign governments could tap into the net and obtain trade secrets or other sensitive data that could then be passed on to competitors.

Global network managers also should keep track of the physical layout of networks abroad to ensure that only authorized users gain access to data. When dealing with international networks, users have to contend with a greater number of security concerns than they do domestically.

From a network security standpoint, vendors and consultants cited two examples to illustrate their points that networks abroad are susceptible to unauthorized access.

They singled out reports by the U.S. National Security Agency (NSA) that stated it regularly stumbled across trade secrets of foreign companies during routine data gathering in foreign countries. They said if the NSA has this capability, users should be aware that other countries may have it as well.

Vendors also pointed out that because the Chinese government was able to intercept satellite television transmissions during the Tiananmen Square crisis, other countries might be capable of tapping into satellite transmissions too.

In addition to dealing with concerns about eavesdropping, users should keep close tabs on the physical layout of their networks abroad, according to Geoffrey Turner, a consultant with SRI

*(continued on page 24)*

PERSPECTIVES

BY LILLIAN GOLENIEWSKI AND RAY HORAK

## Advanced intelligent nets wave of the future

As evidenced by a series of technical presentations at a major research symposium last spring, carriers around the world are moving forward with plans to implement Advanced Intelligent Networks (AIN).

A new generation of public network technology, AINs are expected to enable users to access a host of advanced switched applications. While widespread deployment of AINs is still several years away, carrier representatives at the XIII International Switching Symposium in Stockholm, Sweden, in May outlined plans to begin supporting the technology in their public networks within the next couple of years.

More than 30 papers on AINs were presented at the triennial conference, which was attended by about 4,000 telecommunications professionals from 84 countries.

**General architecture**

While the specifics of AIN implementations vary to some degree, all of the presenters said that the same general architecture will be used to deploy the technology. In an AIN implementation, switched AIN traffic will first be routed to a local central office switch that will separate AIN traffic from regular telephone traffic and use a series of interconnected, customized processors to route and process AIN transmissions.

AINs are intended to operate in a multivendor environment, serving as software and hardware platforms on which users,

*(continued on page 25)*

*Goleniewski is president and Horak is vice-president of The Lido Organization, a network consultancy in Mill Valley, Calif.*

# Users see no end to EDIFACT, X12 standards clash

By Walter Sweet
West Coast Correspondent

SAN FRANCISCO — Little is being done to resolve the philosophical differences between EDI for Administration, Commerce and Transport (EDIFACT) and ANSI X12 proponents, which may force U.S. and European users to support different de facto standards, said users at a recent electronic data interchange conference here.

Should that happen, EDI users in the U.S. that support the X12 standard would have to use a hodgepodge of translation packages to communicate with customers and suppliers abroad that back EDIFACT.

With translation packages costing anywhere from $5,000 to $45,000 each for a base package, and additional charges to support more EDI transaction sets, that could turn into an expensive proposition.

This year's Second International Congress of EDI Users contrasted sharply with last year's meeting at which EDIFACT and X12 camps entered into heated exchanges over which methodology should be adopted as a standard.

Instead, users who gathered here were focusing on how to implement EDI and said they are intent on letting market usage dictate whether X12 or EDIFACT will prevail as the industry standard.

"Standards are important, but the real issue is getting EDI implemented," said Jerome Dreyer, president and chief executive officer of the Electronic Data Interchange Association.

Torrey Byles, a consultant with Input, a market research firm in Mountain View, Calif., said he believes EDIFACT will be used for international trade, while X12 will be used domestically by countries such as Australia, Canada, Japan, New Zealand and the U.S. Byles said users could handle both EDIFACT and X12 with any of several dozen translator packages, which are manufactured by between 30 and 40 vendors.

Users already contend with variations within the X12 standard, such as with some invoice transmissions, he said. Working with these differences will be no different than working with the two EDI technologies, he added.

Byles said the recent announcement by the Automotive Industry Action Group to use X12 could stifle the spread of EDIFACT ("Automakers try to stir up EDI interest," *NW,* July 23). Even in Europe, an EDIFACT stronghold, the auto industry is using the Organization for Data Exchange through Teletransmission in Europe (ODETTE), a standard developed before EDIFACT.

According to Ken Wainscott, a senior consultant with Ciba-Geigy, a Swiss-owned pharmaceutical and chemical firm, his company uses X12 in the U.S. and EDIFACT for international connections. Right now, the X12 and EDIFACT work indepen-

## Global nets elevate security

*continued from page 23*

International of Menlo Park, Calif. He suggested strictly enforcing the size of the network and putting in place strict user access policies.

"A unique aspect of an international network is trying to identify the extent of the connections," Turner said. "You think you have X number of LANs and the LAN ends there. But LANs are often bridged to other LANs. There could be LANs you're not aware of, and if that's the case, you may have some difficulty controlling outside use of those LANs."

**Possible precautions**

Vendors and consultants advise net managers to use encryption modems to transmit information between the U.S. and sites abroad in order to protect information on their networks. In countries where these types of modems might be prohibited, they suggest using an encryption software package.

"Use encryption to protect communications sent via satellite," said Don Murtaugh, director of network operations for BT Tymnet, Inc. "People have to remember that they can't think in terms of U.S. law. Something guarded under U.S. law may be totally legal in another country."

According to Japan Air Lines, the company has a secured network so its customers cannot monitor information about what their rivals are shipping and about which customers its competitors serve.

"Network security is a big concern for us," said Roy Oshiro, manager of cargo sales for Japan Air Lines. "For complete security, we haven't set up an interface to the outside."

The company has considered setting up an electronic data interchange link to its customers that would allow them to monitor their shipments with the airline. But it is reluctant to do so because it is concerned customers would use the network to snoop on competitors. The airline's net is used for processing shipping orders and tracking cargo sent by customers, including many high-tech firms from Silicon Valley.

According to Murtaugh, users must take the initiative to protect their networks from individuals or governments that might try to pirate information. In the U.S., he said, it's less of a concern because there are laws that would deter someone from eavesdropping on a network. But those laws might not exist abroad. "In the international arena, when you cross that border, the world takes on a whole different outlook," he said.

dently of each other, and the company is not sure whether it will integrate the two with a translator.

Wainscott said his company's agricultural division recently added an EDI link. The company uses X12 domestically because the agricultural and chemical community has adopted it as a standard.

According to Teoman Oruc, senior systems analyst with ICI Canada, Inc.'s bioproducts division, his company instituted an EDI network using EDIFACT because ICI's parent company is European.

Oruc questioned why other users do not conform to standards but spend their time translating information from other users that they add on. "It's a nice way to keep your job, but that's not the way to go," he said.

## Some question FCC ability to dictate

*continued from page 23*

national switched traffic will originate in the U.S. this year, a quarter of the global total of 30 billion minutes.

### Domino effect

U.S. officials say that one of the biggest reasons for this disparity is that foreign carriers charge more for international calls than U.S. carriers do. Reducing accounting rates would enable foreign carriers to reduce service prices, which could then increase international calling volumes and lessen the U.S. deficit, FCC officials reason ("U.S., Europe to investigate int'l rates," *NW,* April 23).

But getting foreign carriers to accept lower accounting rates will be difficult, since these rates are seen as a lucrative source of income.

Many U.S. carriers say they have wanted to reduce accounting rates for years but have been unable to because of resistance from foreign counterparts.

By saying it wants to reduce accounting rates, the FCC hopes it will strengthen the hand of U.S. carriers in these negotiations. But if foreign carriers resist, the FCC could be severely hampered.

The FCC said it has tentatively concluded it has the power to unilaterally order accounting rate reductions. But this power is untested, and may be unenforceable on foreign carriers, according to many lawyers.

## Advanced intelligent nets wave of future

*continued from page 23*

vendors and carriers can build public network applications. This concept allows for the development of applications that are available to all subscribers, regardless of the type of customer premises equipment they use and the central office switches they install.

A Bell Communications Research spokesman indicated that Release 1 of AIN standards is scheduled to be issued in 1991 to the supplier community by the Consultative Committee on International Telephony and Telegraphy. That release will address the functional requirements of individual AIN network elements such as node switches, adjunct central office switch processors and other peripherals.

### Host of applications

Using this AIN architecture, carriers around the world expect to be able to deploy a host of new AIN applications during the next several years. Among the first applications to appear, according to delegates from Bell-Northern Research, Ltd., a unit of Bell Canada, will be Personal Services, which enable customers to use personal identification numbers (PIN) to access calling services from any phone on the public network.

The Personal Services that could be accessed via PIN numbers include speed dialing, three-way conference calling, voice mail and electronic mail. Users would only need to pick up a public telephone and enter their PIN in order to access any service to which they have subscribed.

Today, those services are offered only on a line basis, which means that users can access them only from their own residential or business subscriber lines.

Other AIN services likely to be deployed in the near future include Follow-Me services, which will enable users to have their calls forwarded to any telephone on the public network or across different cellular and public networks; Data-Oriented services that will enable users to access such carrier information as network traffic statistics; and various on-line information services. Some carriers are focusing on toll-free calling services as one of the first areas in which they plan to deploy AIN technology.

For example, France Telecom plans to begin phasing in AIN technology in 1991 to support such toll-free calling services as customized call routing, customized announcements, user-specific queuing and call distribution capabilities. These capabilities will be embedded in the public network rather than in customer premises equipment, which is now the norm.

In about the same time frame, carriers throughout Europe are planning to use AIN technology to route calls throughout a series of interconnected, digital cellular networks expected to be built on the continent. Closer to home, an official with US West Advanced Technologies, Inc. indicated that US West, Inc. is working in conjunction with a number of vendors to trial a suite of unspecified AIN services in 1991.

Wetzel suggested that the AIN services trialed could include such things as letting users on any telephone have their calls forwarded to another telephone if their line is busy or if they are not available to answer. Currently, this feature is available only to Centrex subscribers or users of customer premises equipment with this capability embedded in it.

# FAXNeT is a service designed to help readers of *Network World* gather important information via FAX on products and services advertised in *Network World*.

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Listed below in the FAXNeT Directory are the FAX numbers of participating advertisers in this week's issue of *Network World* and the page number where the ad appears. To use FAXNeT cut out the FAXNeT form and make a copy of the form for each inquiry you want to make. Then just FAX it to the vendor's number listed in the FAXNeT Directory.

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☐ URGENT

Action Requested
- ☐ Request for Sales Call
- ☐ Request for Proposal
- ☐ Request for Information

Purchase Timeframe
- ☐ Within 60 Days
- ☐ Within Six Months
- ☐ Within One Year

Scope of Purchase Responsibility
- ☐ Enterprise Wide
- ☐ Departmental

Purchase Influence/Number of Sites
- ☐ One Site
- ☐ 2-9 Sites
- ☐ 10-20 Sites
- ☐ 21+ Sites

Product Advertised: _____

_____

Intended Application: _____

_____

_____

## This week's FAXNeT ADVERTISERS

# PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

## First Look

### Entry-level image system runs on LANs

**ViewStar Corp.** recently unveiled an entry-level imaging system that runs on Novell, Inc. NetWare local-area networks.

ViewStar's **Entry Level System** includes server software for five users that enables them to capture, store and pull up image files on LAN workstations. The software's data base can support approximately 100,000 documents.

On the hardware side, the product includes a 600M-byte optical disk, a document scanner, a laser printer and a 2.2G-byte tape backup system.

Entry Level System is intended for users that want to develop test applications or an imaging prototype before investing in a full-scale imaging system. It provides an easy upgrade path to ViewStar's high-end systems, which would cost approximately $250,000 for 50 users.

Entry Level System costs $130,000, and it can be purchased without any of the hardware components for $97,500. The product is expected to be available in the fourth quarter.

*ViewStar Corp., 5820 Shellmound St., Emeryville, Calif. 94608; (415) 841-8565.*

### Disk mirroring added to Macintosh networks

**Storage Dimensions, Inc.** recently added support for disk mirroring to the software that runs on its hard disk drives used in the Apple Computer, Inc. AppleShare local-area network environment.

**MacinStor Installer Software Version 3.0** runs on any of the company's MacinStor hard disk subsystems, which support up to 2G bytes of storage.

With disk mirroring, users gain a level of fault tolerance because if one disk fails, the second one automatically takes over data storage tasks. Users also gain greater data integrity because data is written to two disks instead of one..

The software also supports a volume spanning feature that allows multiple hard disks to be viewed as one contiguous volume so that users do

*(continued on page 29)*

# ACD now supports integrated voice/data

## Rockwell's CallPower CA allows development of applications linking Galaxy ACD, data bases.

**By Tom Smith**
New Products Editor

DOWNERS GROVE, Ill. — Rockwell International Corp. recently introduced a product that allows agent terminals connected to its Galaxy automatic call distributor (ACD) to support integrated voice/data applications.

The company's Switching Systems Division said the CallPower CA consists of a C language application program interface (API) and an interface card that links an Industry Standard Architecture IBM Personal System/2 to the Galaxy switch.

Using CallPower CA, users can develop applications in which an incoming call can trigger a data base query, for example, so information pertinent to the caller can be delivered to the agent's screen along with the phone call. The API can be used to develop applications that support Integrated Services Digital Network's automatic number identification function.

ACDs distribute incoming calls, typically received over 800 number lines, to available agents in applications such as telemarketing, credit card customer service and airline reservations.

The product is offered in two versions: a Developer's Toolkit, with which users can develop their own integrated voice/data applications, and a Turnkey Solution, in which Rockwell writes the integrated voice/data application for the user.

In airline reservation applications, for instance, the Galaxy ACD could scan an incoming telephone number, which could prompt CallPower CA to kick off a data base lookup for information associated with that telephone number, such as the caller's most recent flights taken and frequent flier number.

The software can also synchronize the display of information on-screen with the ringing of the agent's telephone.

The ACD could also send the trunk group number associated with the incoming call to the PS/2. Based on that trunk group, the software could call up information about products or services that were advertised with that number.

> The software can synchronize the display of information with the ringing of the telephone.
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*(continued on page 28)*

# *UniHorn APIs let ARTIC card users link to WANs*

PACIFIC GROVE, Calif. — UniHorn, Inc. recently unveiled application program interfaces (API) that enable users to write applications that link IBM's Real-Time Interface Coprocessor (ARTIC) to Systems Network Architecture, Synchronous Data Link Control and X.25 lines.

The applications developed using the APIs will enable ARTIC users to communicate over wide-area links with hosts or microcomputers supporting automated teller machine transactions, airline reservations and credit card verification.

Based on an Intel Corp. 80186 microprocessor, IBM's ARTIC cards off-load processing of some applications from the personal computers in which they reside.

Applications developed from the APIs can run on any DOS- or OS/2-based IBM Personal Computer or Personal System/2, or in a local-area network environment, according to Ken Belanger, vice-president at UniHorn.

**And the APIs are . . .**

The six APIs are: UniHorn SNA Workstation LU XX, UniHorn SNA Gateway LU XX, UniHorn Workstation SDLC, UniHorn Gateway SDLC, UniHorn Workstation X.25 and UniHorn Gateway X.25.

The workstation version of each API supports applications that serve a single personal computer, while the gateway supports applications on LANs that run Network Basic I/O System.

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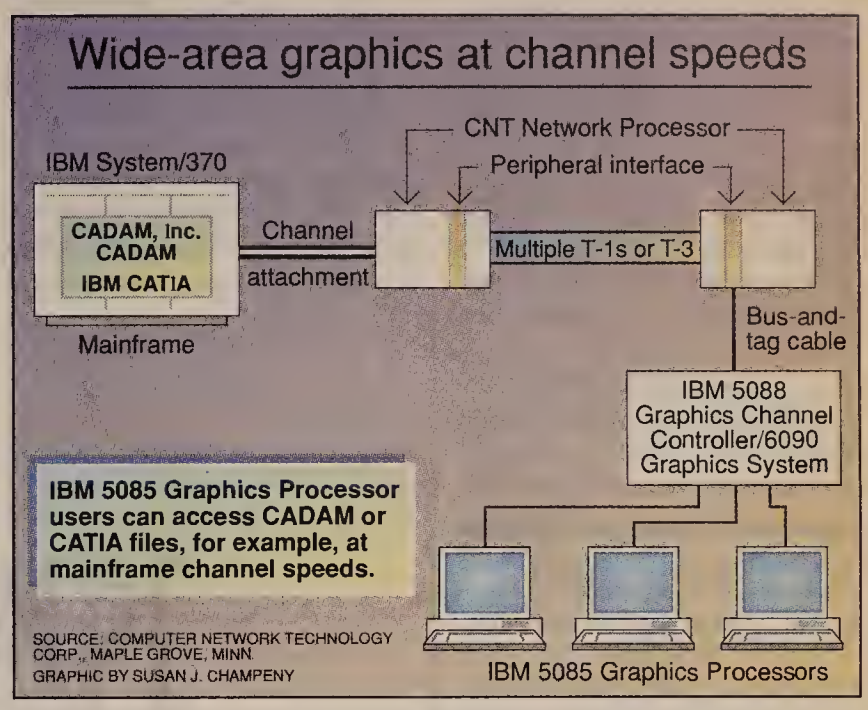


# Software upgrade supports graphics at channel speeds

## CNT enhances its mainframe channel extender.

**By Tom Smith**
New Products Editor

MAPLE GROVE, Minn. — Computer Network Technology (CNT) Corp. recently enhanced its IBM mainframe channel extenders to support IBM graphics controllers and workstations.

Users of host-based computer-aided design and manufacturing applications, such as CADAM, Inc.'s CADAM or IBM's CATIA, will experience faster response times as a result of the channel-attached link support.

CNT has enhanced firmware on the peripheral interface of its Network Processor so it can support IBM 5088 Graphics Channel Controllers and 6090 Graphics Systems, two controllers that link IBM 5085 Graphics Processors to mainframes.

The peripheral interface previously supported printers and tape drives.

The Network Processor is a channel extender that allows a single IBM host to maintain channel-speed connections to multiple remote sites. Network Processors reside at the host location and each remote site and are connected via groups of T-1 lines or a T-3 trunk.

With the software enhancement to the Network Processor's peripheral interface, users can attach 5088 Graphics Channel Controllers and 6090 Graphics Systems to the Network Processor, allowing multiple Model 5085 Graphics Processors to receive channel-speed bandwidth at any remote site.

IBM's earlier generation 5088 Graphics Channel Controllers were typically used to support maximum link speeds of 56K bit/sec, while the newer 6090 Graphics Systems can support a T-1 link, CNT said.

However, CNT said it delivers better response time by transmitting data in a single block, whereas the IBM product separates the data into multiple blocks, which must then be reassembled.

CNT said one of its customers performed tests to compare response time between a 6090 Graphics System and a 6090 Graphics System attached to the Network Processor over a 1,000-mile T-1 link.

For a single user requesting three screens of data, Network Processor provided 31% better response time; for five workstations, CNT's product delivered 63% better response time, the company said.

Graphics controllers are daisy-chained together into the peripheral interface via a single, block-multiplexed IBM bus-and-tag cabling port.

The Network Processor previously supported several interfaces: an interface between the Network Processor and IBM- and plug-compatible mainframes that support channel speeds up to 4.5M byte/sec; interfaces to wide-area communications links operating at speeds up to T-1 and T-3; and local-area network interfaces that support Ethernet and CNT's proprietary LANs operating at 50M and 100M bit/sec.

Users will either need to add a new $19,000 peripheral interface to an installed Network Processor if their existing interface has reached capacity, or if they have additional capacity, the company will provide a software upgrade for free.

The new software is available now.

CNT can be reached by writing to 6665 Wedgwood Road, Maple Grove, Minn. 55369, or by calling (612) 420-4466.

## UniHorn APIs give link to WANs

*continued from page 27*

The APIs are offered in C and Assembler versions, Belanger said.

Applications developed with the SNA APIs support wide-area communications with IBM LU 0, 1, 2, 3, 4 and 7. LU 0 is the protocol used in IBM's Information Management System, as well as ATMs, airline reservation systems and credit card verification nets.

LUs 1, 2 and 3 are used to support IBM 3270 display stations and printers, while LUs 4 and 7 perform the same function for IBM 5250 terminals.

The workstation and gateway versions cost $600 and $1,900, respectively.

Applications developed with the SNA APIs can work with 3270 terminal-emulation programs. The terminal emulation can be performed by third-party products or developed with forthcoming UniHorn 3270 APIs. In addition to APIs that will let users develop 3270 emulation programs, UniHorn plans to introduce APIs for Advanced Program-to-Program Communications applications. These APIs will be available within 30 to 60 days, Belanger said.

The SDLC workstation and gateway products use SDLC for communications between ARTIC-based workstations and mainframes, minicomputers and other personal computers. The SDLC workstation and gateway versions cost $400 and $1,600, respectively.

Finally, the company's X.25 APIs enable personal computer and LAN users to communicate over an X.25 network. The workstation version is manufactured by Quadron Service Corp., while UniHorn developed the gateway API. The workstation and gateway versions cost $600 and $1,900, respectively.

The six APIs are available now.

UniHorn's Software Solutions Division can be reached by writing to 167 Central Ave., Suite B, Pacific Grove, Calif. 93950, or by calling (408) 655-1117.

## ACD supports voice/data

*continued from page 27*

The API can also be used to develop applications in which telemarketing agents are prompted to request certain information. For example, a customer seeking account information might need to provide a personal ID number before the agent could access that information. In that scenario, the application software would prompt the agent to ask the caller for that ID number.

The software can interact with a variety of data bases, including those running on hosts, minicomputers and mainframes. A PS/2 residing on a LAN, for example, could communicate over the LAN with a data base residing on the LAN server.

The PS/2 will combine the functions of the proprietary operator console used on Rockwell's ACD, as well as the dumb terminal or personal computer typically used to access the data base. The PS/2 interface card has an RJ-11 port that enables users to install a telephone handset, but functions such as dialing a telephone can be performed from the personal computer keyboard because the interface card emulates Rockwell's proprietary telephone console.

CallPower CA is available now. The Developer's Toolkit, including software and interface cards for five PS/2s, costs $47,500. Pricing for the Turnkey Solution is dependent on the application and the number of users.

Rockwell can be reached in writing at 1431 Opus Place, Downers Grove, Ill. 60515, or by calling (312) 960-8000.

> The interface card has an RJ-11 port that enables users to install a telephone handset.
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## First Look

*continued from page 27*

not need to separate large files such as those created in multimedia applications.

MacinStor Installer Version 3.0 is expected to be available beginning in August on all new MacinStor hard disk drives from Storage Dimensions. Software upgrades are available to current users for $50.

*Storage Dimensions, Inc., 2145 Hamilton Ave., San Jose, Calif. 95125; (408) 879-0300.*

### Sun workstations gain access to IBM mainframes

**Brixton Systems, Inc.** recently introduced software that enables Sun Microsystems, Inc. workstations to communicate with IBM mainframes by emulating IBM 3270 terminals or LU 0 devices.

The software, **BRX7300 LU Services Option,** works with any of three existing Sun-to-IBM host communications products made by Brixton: SNA/IP Gateway, SNA Peripheral Device Option and SunNet Manager Server. The interface cards provided in those products emulate IBM PU 4 devices, or front-end processors, and encapsulate data in Synchronous Data Link Control format for transmission to the host.

BRX7300 LU Services Option runs on a Sun workstation to support LU 0 emulation. A Sun user would be emulating LU 0 for communications with IBM's Information Management System, as well as automated teller machines, airline reservation systems and credit card verification systems.

The LU 2, or IBM 3270 terminal emulation, option lets users access IBM host applications.

BRX7300 LU Services Option is available now. The LU 0 option costs $2,500 for a 10-user license, while the LU 2 option costs $3,000 for a 10-user license.

*Brixton Systems, Inc., 185 Alewife Brook Pkwy., Suite 4200, Cambridge, Mass. 02138; (617) 497-2938.*

### Gateway lets Wang and Novell users communicate

**MacSoft, Inc.** recently introduced a gateway that enables users of Wang Laboratories, Inc.'s VS Office and Novell, Inc.'s Message Handling System (MHS) electronic mail packages to exchange messages.

**Lightspeed Mail Gateway** consists of software that resides on an IBM Personal Computer AT, typically one that is configured as an MHS mail server. It converts data between VS Office and the formats used by MHS-compliant packages such as cc:Mail, Inc.'s cc:Mail. MHS is the messaging protocol for Novell NetWare local-area networks.

The gateway works in conjunction with MacSoft's Lightspeed NVS software, which lets VS minicomputers share resources such as printers and storage devices with LANs. All LAN users are listed in a VS Office directory, and VS Office users are listed in a pop-up window. These lists are automatically updated when users are added to the network.

Lightspeed Mail Gateway is available now. Pricing ranges from $1,300 to $6,300, based on the size of the VS processor.

*MacSoft, Inc., 2920 F St., Suite E-14, Bakersfield, Calif. 93301; (805) 324-4291.*

### TurboCable lengthens distance between two ATs

**Western Telematic, Inc.** recently introduced a product that significantly lengthens the distance between two hard-wired IBM Personal Computer ATs running file-transfer software.

**TurboCable** consists of unshielded twisted-pair cable and two high-speed serial port interfaces that plug into the personal computer's RS-232 port. Those interfaces convert the data signal from RS-232 to RS-422 for communications at 115K bit/sec for distances up to 750 feet.

Because of their high transfer rate, file-transfer utilities have limitations that prevent two hard-wired personal computers from sharing files beyond a distance of about eight to 10 feet over RS-232 connections.

TurboCable is expected to be available in August for $149.

*Western Telematic, Inc., 5 Sterling Ave., Irvine, Calif. 92718; (714) 586-9950.*

# OPINIONS

**MANAGEMENT ISSUES**

BY JACK SOBISH

## Debunking the skilled worker shortage myth

One issue covered in your recent article ("Managers speak out on networking challenges," *NW*, May 21) confused and infuriated me. The survey stated that "48% of respondents say they are concerned about finding workers skilled in data communications" and that they are concerned about turnover. This statistic conflicts with my experience as a communications analyst in the market for a job.

Last November, executive management of the $500 million-a-year manufacturing company I worked for decided to make an across-the-board cut of all information systems departments. Although I was a senior analyst with 10 years' experience, I was dropped in the first round.

> A large number of talented people are using recruiting firms to find positions.
>
> ▲▲▲

I immediately began searching the trade journals and newspapers, calling recruiters, and contacting friends and associates for leads. I thought that with my background, I would readily find an opportunity somewhere. Unfortunately, finding a new job in the communications field has been anything but easy.

Two obstacles must be overcome to bring qualified people to needy managers. First, executive management must realize that the network and its staff are a valuable resource. And second, managers who are hiring need to recognize the usefulness of recruiting firms.

All too often, upper management views its communications department as a liability. Faced with budget restrictions, many managers hiring today opt for less-skilled local talent, rather than bring in a more experienced — and expensive — communications professional. The company is betting that the new employee can be fully trained before a major network problem occurs. While the new recruit is attending classes and seminars, the department is understaffed. Then, after two to three years of education, the individual quits for a better opportunity, thus increasing turnover.

In my job search, I must rely on recruiting firms to represent me in certain parts of the country. Recruiters charge a fee, usually a percentage of the applicant's salary, but that fee is charged only when the candidate is hired. Should companies pay recruiting fees, maybe even relocation expenses, up front to bring in an educated, seasoned professional? Or should they hire the candidate who will require company time and resources for education over a two- to three-year period and hope that person doesn't quit? The latter kind of thinking can't be profitable in the long run to a company.

One position for which I had interviewed was advertised in an out-of-state newspaper. I asked the manager if she used recruiting firms. She said no; she thought that candidates who responded to newspaper ads were more serious about a position than those represented by recruiters. In addition, she said she thought that candidates who used recruiting firms were currently employed and were merely testing the waters to see if they could do better. Hiring managers must overcome this kind of thinking. While some applicants may choose to advance their careers this way, a large number of talented people are using recruiting firms to find positions.

I continue to read about the shortage of qualified technical people needed to run our networks for the next five years. My response is, "We're here and available." ◻

*Sobish is an unemployed senior communications analyst living in Holland, Mich. He can be reached at (616) 396-4621.*


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EDITORIAL

## IBM faces the LAN music with a new role for System/370

IBM earlier this month said its System/370 mainframes will take on a new role in the 1990s: that of high-performance servers capable of managing enormous amounts of data generated by high-end workstations.

With this announcement, IBM is attempting to come to grips with an industry shift from hierarchical, master/slave networks to distributed nets that diminish the role of mainframes.

As users continue to embrace local-area networks, mainframe terminal nets give way to net architectures in which hosts are relegated to the support of compute-intensive applications such as computer-aided design and manufacturing or data base management systems. Other applications move to LAN servers.

One factor pushing mainframe users to distributed nets is that LAN environments provide a lower cost per seat than mainframe environments, making it easier to justify expenditures.

For instance, The Travelers Corp. estimates that it costs $700 per user per month to perform application development with LAN-attached workstations rather than host-attached terminals. By contrast, a mainframe setup costs from $1,100 to $1,200 per user per month.

Recognizing this, IBM said it hopes to carve out a new LAN role for its System/370 mainframes, which have long been recognized as the company's cash cow.

One of the issues IBM will have to address in this effort is protocol support. IBM mainframes predominantly support proprietary protocols. But with the call to integrate LAN traffic into the host realm and the shift by many customers away from proprietary backbones to multiprotocol LAN internetworks, IBM will have to build support for various LAN protocols into its hosts.

The company also needs to enhance its hosts' ability to act as true servers for networked client workstations. Rather than force users to communicate with hosts via 3270 terminal emulation, IBM hosts must look to workstations as peer devices.

One way of providing for that would be to offer direct LAN operating system support on the mainframe. IBM should open up its mainframe line to support a range of vendors' network operating systems.

Although the task would be difficult to achieve in the hierarchical world of Systems Network Architecture, it could enable the machines to play a more immediate role in existing LANs. Such a move, however, may endorse a shift away from "mainframe centralism" that IBM would be loath to back at this point.

Where IBM will go from here is anyone's guess, but at least it seems to be aware of the need, which is a step in the right direction. ◻

# OPINIONS

## Will users benefit from telco entry into the cable industry?

### PRO:

By ALAN PEARCE

Almost every policymaker in Washington, D.C. is sick and tired of the cable television industry's lame and pathetic pleas that cable remain almost totally unregulated and free from any serious competition. While cable TV companies pour millions of dollars into congressional campaigns lobbying for freedom from regulation, they continue to pursue monopoly profits by gouging consumers.

Since Congress deregulated cable TV three years ago, cable rates have risen an average of 30%. Cable customers are constantly complaining about cable companies' high rates, poor service quality and take-it-or-leave-it attitude.

The public policy answer, it would seem, is to encourage more competition for cable TV. In short, to teach the industry a lesson it must learn — and fast. Another alternative is to reregulate the industry, an option that is now winning support on Capitol Hill.

Twenty years ago, when the government adopted public policies toward the infant cable industry, several protective rules were promoted. The most important were:

- Protection from competition by the telecommunications industry, in the form of the Federal Communications Commission's telephone company/cable TV cross-ownership prohibition of 1970. In short, telephone companies cannot operate cable TV systems in their telephone service areas.
- Protection from domination by the three major TV networks — ABC, CBS and NBC — by passage of the TV network-cable TV cross-ownership prohibition, also adopted by the FCC in 1970. This rule says that the TV networks cannot own any cable systems in the U.S.
- A so-called "compulsory license" by which cable TV was given over-the-air broadcast signals without having to pay the broadcasters. This congressional policy, adopted in 1976, gave cable companies free access to the over-the-air broadcast programming they needed. Even today, cable TV generates most of its revenue by reselling over-the-air broadcast signals, mostly from the three

*(continued on page 39)*

*Pearce is president of Information Age Economics, Inc., a telecommunications research firm in Washington, D.C.*

### CON:

By STEVE EFFROS

Inviting the nation's large regional telephone companies into the cable television business would be the most anticompetitive move the government could make.

That statement might surprise you, since you've probably heard a good deal of rhetoric from Congress, the Federal Communications Commission and the telephone companies about how telephone company entry into cable would establish true competition in the video distribution market. Anyone who has dealt with the telephone companies knows the myth of that contention.

During the past decade, the cable industry has focused heavily on improving its own infrastructure and is poised to provide more and better services to consumers. Much of the improvement in cable plant can be directly attributed to deregulation of the industry, which took place in 1986, when the rate deregulation mandated by the 1984 Cable Communications Policy Act went into effect.

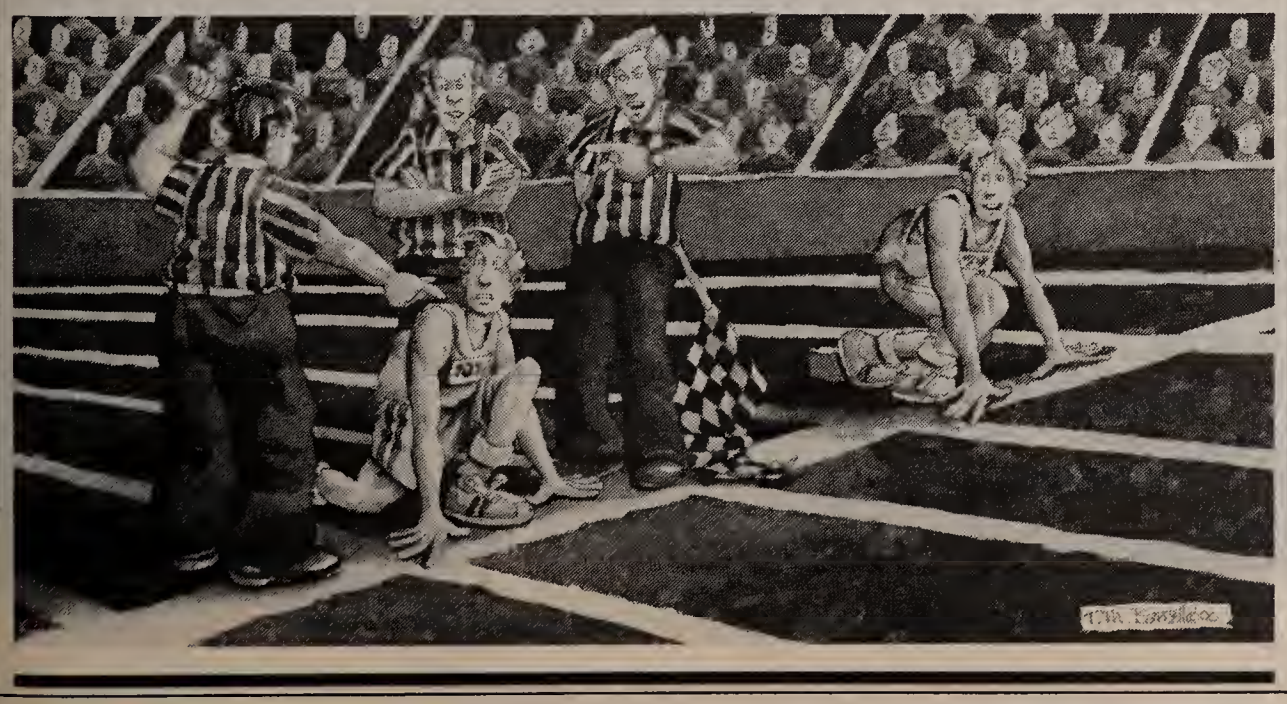
For instance, in 1984, operators spent $217 million to upgrade existing cable systems. But by last year, that number had grown to $515 million, with much of the investment going toward the installation of fiber-optic backbone systems. Those dollars made room for more channels on systems, extended the penetration of stereo sound and improved signal quality. In addition, this revenue ushered in the age of addressability, permitting subscribers in many places to specially order video programming, such as fledgling pay-per-view services.

The specter of increased federal regulation of cable is jangling the nerves of cable executives and making predictions of future cable investment rather dicey. Nevertheless, there are strong indications that this technological progress will continue. An industry study predicts that in the 1990s, cable operators will spend about $17 billion to upgrade their plant and equipment, with one third of that amount going to install fiber.

Meanwhile, cable operators last year joined

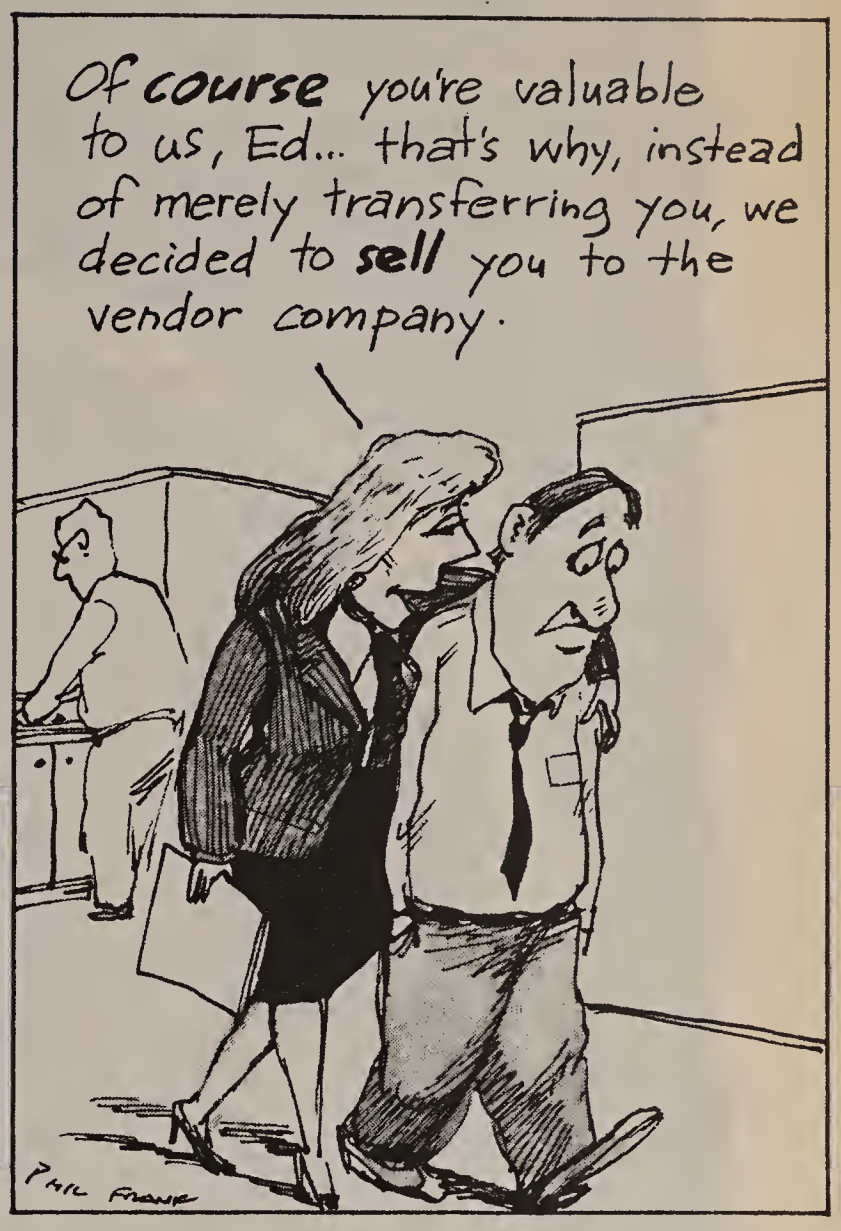
*(continued on page 40)*

*Effros is executive director of the Community Antenna Television Association, a cable television trade association based in Washington, D.C.*



## TELETOONS

BY FRANK AND TROISE




## LETTERS

**Certification confusion**

I'm sure you'll be hearing from a number of vendors about Edwin Mier's feature article ("Software options grow with token-ring market," *NW,* July 9).

Specifically, I think Mier got some bad information from Novell, Inc. when he asserted, "Only one token-ring adapter vendor, Olicom, has obtained official Novell compatibility certification so far." For example, I know that all of the IBM boards are certified since Novell writes the drivers. In addition, I believe that Proteon, Inc., Racore Computer Products, Inc. and Western Digital Corp. have also received certification, although some may have chosen to skip this process.

It is a bit more complex with Madge Networks, Ltd. We have paid the fees and gone through the testing and passed. However, because our Smart drivers incorporate our own version of Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX), Novell has been reluctant to give us certification since it thinks this would certify our IPX/SPX, not just our drivers.

In any event, I'm certain that there are many more

*(continued on page 39)*

Network World *welcomes letters from its readers.*

*Letters should be typed, double-spaced and sent to Editor,* Network World, *161 Worcester Road, Box 9172, Framingham, Mass. 01701.*

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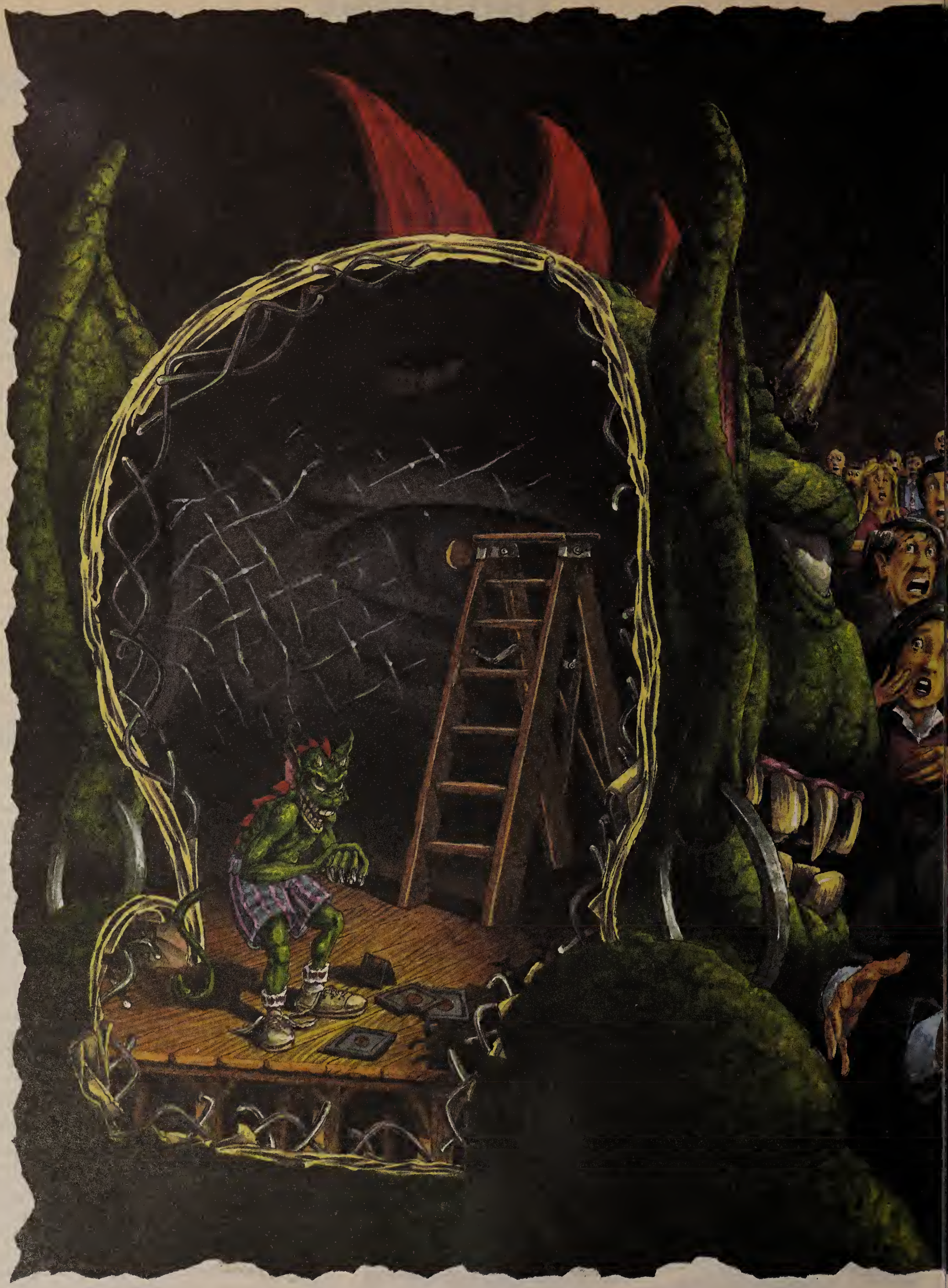

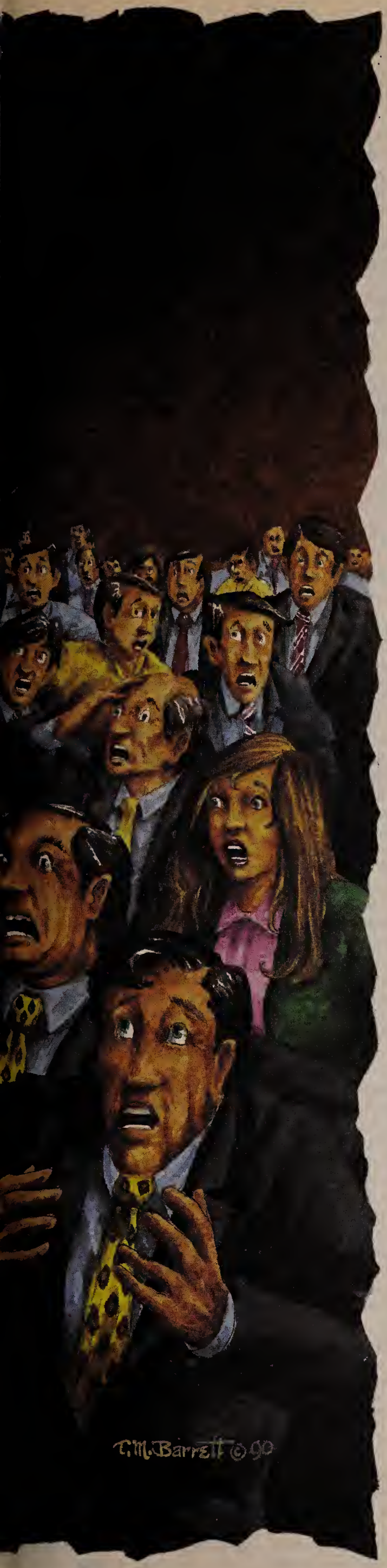


# Networked viruses unmasked

## A behind-the-scenes look at what really goes on inside a networkable computer virus.

By RANDALL NAGY

The term "computer virus," as used by the media, conjures up images of faceless individuals spreading an all-consuming, silicon-destroying infection of biblical proportions throughout the digital computer networks of the free world. Contrary to popular belief, this image of the computer virus is vastly overblown.

In fact, the majority of computer viruses infect only certain parts of an application, operating system or computer network. Consequently, when removing a virus from a computer network, you need to shut down only the infected parts of that net. You seldom need to suspend the operations on an entire computer network to remove a virus.

Only networkable viruses can use data communications networks to both propagate themselves and cause damage within the larger networked environments; for this reason, they're of prime concern to network managers. This article deals only with networkable viruses and not with programs that can't be networked, such as personal computer and shared-disk viruses.

*Nagy is an international telecommunications consultant with Computer Task Group, a telecommunications support service group based in Buffalo, N.Y.*

**Homogeneous networks**

The key to making a network virus-proof is understanding the degree of homogeneity that exists among the network's nodes.

To flourish, a virus requires a well-defined, homogeneous software environment in which to operate. For example, an MS-DOS virus is designed to run under Microsoft Corp.'s MS-DOS only, and a Professional Office System (PROFS) mail bug script is designed to run only in IBM's PROFS environment.

A virus programmer could conceivably design a complex virus that would operate under more than one software architecture. But to do so would require writing several programs, each designed to infect a specific computing environment. The resulting virus would, in reality, be a blend of several individual virus programs, each designed to operate in a specific software environment.

All computer viruses rely on having access to a predetermined

*(continued on page 34)*

ILLUSTRATION ©1990 TOM BARRETT

*(continued from page 33)*
homogeneous environment before they can do damage. Therefore, the more homogeneous a network is, the more virus-prone it is.

A homogeneous network consists of internetworked equipment based on similar, single-architecture software and hardware. For example, a ring of Digital Equipment Corp.'s VAX clusters, Hewlett-Packard Co.'s Apollo Division Domains, IBM's System 370s or Sun Microsystems, Inc.'s Network File Servers, is typically referred to as a homogeneous network.

When several homogeneous computer systems or networks are integrated, the degree of homogeneity in the network becomes a function of how tightly interconnected the software allows the individual subnetworks to become, rather than how similar the interconnected subnetwork hardware architectures are.

**Security and heterogeneity**

In addition to determining the level of network homogeneity, net managers seeking to prevent viral attacks must control user access and the types of software used on the network. Even if a virus program resides on your system, it can do no harm if it's never allowed to run.

The notion of keeping dangerous software from molesting your data processing efforts is nothing new. For years, DP managers have been dealing with the threat of having a disgruntled employee plant a virus, such as a Trojan horse, before making a hasty exit. Such a threat is more of a problem with computer security than with intelligent viruses or guru programmers.

Throughout the history of computing, the threat of such preprogrammed attacks has been practically eliminated by close program examinations, system reviews, and controlled isolation of development and production computer resources.

Even in this day of global marketing and consumption of mass-produced canned programs, maintaining a virus-proof system will still rely on such time-tested procedures and generally accepted policies.

The responsibility of maintaining a proper production environment aside, the amount of damage that any given virus can do once it is in a network will be determined by how well the networked software has been designed, developed and reviewed by its manufacturer.

In an age where interconnectivity among computer resources has become a multibillion-dollar business, it is only natural that some vendors have ignored good security practices in their rush to create solutions to the office automation and connectivity marketplace. Viruses exploit these security weaknesses.

Just how much damage any program can do to your network depends on the capabilities of the software being infected by the virus, as well as how intelligently these features are protected by the operating system.

The reason why many personal computer viruses totally devastate their hosts is that personal computer operating systems, such as MS-DOS, allow any software-literate user to do almost anything, from formatting disk drives to operating communications equipment. On larger multiuser systems such as IBM's MVS and VM, and various vendors' implementations of Unix, the possible damage a virus can do is much more limited because traditional multiuser logon and security algorithms will not, for instance, let the average user format the mainframe drives.

Therefore, in general, if your host-based electronic mail system or operating system will allow another program, programmer or end user to operate it in a harmful manner, and you have no way of limiting or controlling users' access to those features, then you have a potential virus breeding ground.

To determine how much damage a virus can do to your networked resources, you must determine which types of services your software provides to other programs in the system and how user access to these services is managed.

Recall that viruses thrive on similarities in software. Although a virus can attack a corporate computing resource at any layer of network operation, networked viruses usually use higher level, such as Presentation layer or Session layer, resources to access your network "legally" — in other words, with the consent of the operating system.

So whether a virus is written in an interpretive batch language (also known as a script) or is a completely self-sufficient program, it must obtain permission to run on your processor through other software (often referred to as the system executor) before it can damage your network.

**The inner workings**

Any networked computer virus seeking to attack your network must successfully complete three steps. First, the program must find a way to transfer itself from one node to another; this is known as transference assistance. Second, the virus must obtain permission to execute on the node; this is known as executor assistance. Finally, to continue to do damage, the virus must arrive at the next node in good enough condition to propagate itself again to subsequent nodes, which is known as propagation assistance.

To overcome these problems and cause damage to the infected system, a virus program requires assistance from the network operating system and whatever software resides on the network. Without this, the virus must stay put on the original infected node — assuming, of course, there is no sharing of disks via physical transference, or what is more commonly known as sneaker net.

Unfortunately, to help the virus solve these problems, as many solutions can be devised as there are vendors in the market.

**Abuse of services**

Most network operating or mail systems contain utilities that allow software on any node to request that a file be replicated on another node. Such utilities are often the sole reason some companies have networks. But the ability to exchange data and mail provided via networks should rarely permit individuals to exchange programs and script files in a readily executable format.

> The amount of damage that any given virus can do will be determined by how well the networked software has been designed.
>
> ▲▲▲

Most network operating systems allow net administrators to have at least some control over what types of files and scripts are transmittable and should be used to lock out any potential, executable virus programs. After all, it is the transmitted program or script that contains the virus and not, for example, a transmitted memo or meeting schedule.

Merely limiting the transmission of programs and scripts between homogeneous environments on the network will go a long way toward creating a virus-proof net. However, once a virus program has made it onto a network node, there are two vendor-provided methods of viral propagation commonly in use today:

■ **Push-and-go service.** Typically, this is a loophole in either an operating system or software program, such as a disk or other service-sharing utility, that allows users to upload executable software into the host system or network. The system then makes the software available, or even delivers it directly, to stations on the network or to other connected systems.

A practical example of this type of mechanism is the mass mail distribution feature of many software office products. This feature, in combination with operating system features, not only allows users to exchange programs, but combined with mechanisms such as Berkeley Sockets on Unix or IBM's Advanced Program-to-Program Communications Executory on Systems Network Architecture, it can allow programs to redundantly distribute and propagate themselves throughout a network.

■ **Pull-and-go service.** The second mechanism is the "download and execute," or "pull-and-go" migration mechanism. This allows users to download an executable program from the system into their system, network or workstation. Any damage caused by a program operating this mechanism would obviously be limited to the system that requested the pull to occur in the first place, as well as possibly the system from which the virus program had been pulled.

Practical examples of the pull-and-go mechanism abound in the software industry in the form of shared disks, where users can freely exchange programs found on a shared disk, or the programs can be uploaded and downloaded from a computer asynchronously via dial-up access using commercially available products.

Of these two mechanisms, the unsecured push-and-go capability potentially has the most catastrophic consequences for any single homogeneous system. Armed with such a software service, a virus can easily ravage a computer network.

If you discover that your software vendor has allowed for an unsecured mechanism such as a push-and-go to operate on your net, you should make certain that the feature is quite heavily guarded by other security software if the push-and-go mechanism is needed for usual business operations or removed from the system entirely if the feature is not being used.

**How much damage?**

After a virus finds a way to propagate, the amount of damage it can do to your system will depend on how much access to your system the software allows the virus to have. An examination of the types of activities germane to highly software-dependent mail bugs illustrates this concept.

Network damage caused by mail bug viruses is always limited to the loss of network communications and some valuable machine execution cycles, but other resources are typically not affected. For example, CRTs are not usually brought down (at least, not by the invading mail bug virus), direct-access storage devices (DASD) are not formatted, (although they may be filled up), computers are not rebooted and vital software programs are not damaged.

The reason why mail bugs usually won't do more devastating damage to the network nodes than choking a net with mail or the user's DASD with files is that mail packages are usually not permitted to do anything more destructive, such as formatting DASD, by their respective operating systems. In larger systems, the mail utility should never receive permission to conduct more dangerous activity than sending and receiving mail.

Even though a mail bug virus may be allowed to propagate itself to a node, it will typically not be able to access services that haven't been made readily available to the mail system software in general or to the user's identification in particular. Although the damage that the mail bugs can do is often expressed in terms of downtime and can cost a company millions of dollars, these types of viruses will typically be disabled when the networked application that was assisting the virus — in this case, the mail system — is brought down.

Therefore, a total system shutdown typically won't be required to eradicate a mail system virus. This is also true for other networkable computer viruses that use, for example, APPC, PROFS, Unix Mail or Sockets; if you eliminate the transference, execution and propagation capabilities, you eliminate the virus.

**Here's the trick**

The trick here is to eliminate as many of the three vital services from the virus that have been discussed, while at the same time disturbing as little of the usual daily DP activity as possible. This may sound simple, but the typical network manager's reaction to a virus is to shut the network down completely first and ask questions later.

This overreaction not only adds to user panic, but it increases the cost of the virus encounter since employees will be forced not only to refrain from using the mail system but also from performing any computer-aided activities such as writing memos or working on personal documents.

Investing some time in exploring the capacity that your networked software has for providing transference, execution and propagation services to an invading virus will enable end users to get work done if a viral attack occurs, rather than having all of them take the day off while the entire network operation is brought down to be dissected.

The fact that an unauthorized individual is able to gain access to your network and introduce a virus program is really a software security problem, not an intelligent virus problem. Once a virus is thriving in your network system, however, knowing how the program entered the net will do little good unless you can quickly determine exactly how the program is propagating itself and how to shut down as little of the system as possible to put the virus out of business.

Trends and TECHNOLOGIES RESHAPING networks:

**Vendor mergers**

# When elephants dance

CONTINUED FROM PAGE 1
whose jobs, in many cases, hinge on their choice of vendors.

These concerns explain much of the hubbub that accompanied last May's highly touted merger between Novell, Inc. and Lotus Development Corp., which subsequently fell through.

The Novell/Lotus combination intended to integrate the two companies' products more closely — clearly a benefit to users and a competitive advantage for the newly merged company.

However, the combined company also intended to team with WordPerfect Corp. to create a single service and support organization for the products of all three companies — a move not at all reassuring to users, third-party developers and others dependent on their support.

This article first reviews some merger and acquisition issues and then identifies the steps network managers can take to protect their company should one of their vendors become involved in a merger or acquisition.

**Effect of mergers on users**

Mergers, especially in high-technology fields, occur rather naturally in the cycle of technological evolution. As new technologies develop, companies form to exploit opportunities in newly targeted growth markets. Then, as the technology progresses from the embryonic stage to the introductory, growth and mature stages, consolidations and mergers become inevitable.

*(continued on page 38)*

*Worth is a senior consultant in the Information and Telecommunications Systems practice at Arthur D. Little, Inc. in Cambridge, Mass.*

The maneuverings of vendor mergers can leave users scrambling for safety.

When their systems aren't integrated,

some businesses

waste time and effort

running from

department

to department

until finally

to department

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*(continued from page 35)*

In these cases, most attention is typically directed at the merging companies themselves, focusing on issues such as increasing profits, closing plants and laying off employees.

The network managers of the vendor organizations that are merging are primarily concerned with how the two organizations will interact.

However, mergers affect network managers at user companies in an entirely different way. For example, maintenance service might deteriorate, repair parts may become scarce, products may be discontinued or development programs may be canceled. Some issues can be legitimately addressed by contract negotiations between the user and vendor organizations, but others cannot.

Conversely, a merger may be quite favorable for users. A firm with deep pockets may provide much-needed funds to its merger partner. In another case, a merger may enable two diverse product lines that are conceptually and logically complementary to be brought more closely together to the benefit of users of both product lines. In situations such as these, the network manager's challenge is to benefit as much as possible from the merger.

When a merger of suppliers or vendors is announced, or even suspected, network managers must determine what effect the action may have on their company as a user of vendors' products or services.

The steps summarized in the graphic on page 39, and expanded on in this article, present a logical and effective way to evaluate opportunities or threats likely to be created by a merger.

### Determine merger nature

Once a merger announcement is made, the first step is to consider what type of merger will take place and what its effects will be. Naturally, announcements will portray the pending merger as beneficial to all parties concerned, but the odds are against this being true.

When assessing a merger, a good place to start is with the actual press releases from the companies involved. Then, review trade publications that provide editorial and industry experts' commentary to determine details such as reasons for the merger, benefits to the merging parties and their customers, resulting organizational structure and management changes and planned operational changes. However, while industry publications may be a good source of ideas, network managers should never substitute published information for independent thought.

Having examined the concept of the merger, network managers must then identify the expected effects — both positive and negative — the merger will have on their organization.

The most important parts of what any vendor brings to the table in a merger situation are its research and development program, product delivery and competitive positioning.

The R&D program will most likely be changed — for the better in some cases and for the worse in others. Because most companies keep their R&D efforts cloaked in secrecy, users may be unaware of how the merger has affected their vendor's R&D effort.

One positive effect of a merger is that increased funding or new technology may become available to a vendor from its new partner; perhaps even overall financial stability may be provided. For these reasons, Paradyne Corp. users were most likely pleased when AT&T, with its substantial technical and economic resources, bought the company.

On the other hand, sometimes a newly merged company may cut back on what it sees as redundant efforts or competitive technological approaches in favor of focusing on one area.

Also, vendors may develop ill-conceived or poorly designed product enhancements for the sake of retaining backward compatibility as part of marketing policy but without regard to the underlying technology derived from the merged organizations.

Suppose that a user organization made a significant investment in a particular product line with the anticipation of moving forward with technological advances that would be incorporated over time. Later, a merger could foil this company's plans because R&D on the line is curtailed and enhancements cease to materialize. For example, Rolm Co. users have been concerned about potential product line changes that Siemens AG plans to make, despite assurances of protection for the installed base.

Similarly, product delivery can be adversely affected, particularly through manufacturing and service changes. On the plus side, production may be shifted to other plants for increased efficiency and economies of scale, and the combined service organization may result in such user benefits as increased geographic coverage and a larger service staff to reduce response times.

However, potential negative effects may be that certain products are redundant or inconsistent with others in the combined organization and, therefore, get dropped from production and support. For example, after buying Rolm in 1984, IBM announced in 1987 the IBM 9751 CBX as the intended replacement for Rolm's CBX II line — though it wasn't until this May that development of any future CBX II hardware or software not related to serviceability was terminated.

How will service change if half the vendor's staff is now trained on only half the product line? The answer depends on how it is managed, and network managers must assess the possibilities.

For example, the new organization may seek economies of scale by combining the previously separate service organizations and reducing staff, even though the individual service representatives can't really substitute for one another because of their background and training.

The competitive aspects of a merger may also have favorable or unfavorable effects on users. If the two entities were previously rivals in a somewhat limited field of entrants, then prices may go up because of the reduced competition resulting from the merger. If, however, the two companies were weak relative to other companies with similar products, then the merger may enhance competition, as when Burroughs Corp. and Sperry Corp. merged to form Unisys Corp.

### Assess business relationship

Network managers' next logical step in evaluating a merger is to consider their company's current business relationship with the vendors involved. Is the firm critically dependent on one or both of the merging parties' products and services? In what stage (introduction, growth, maturity or decline) of the product's life cycle are the company's currently installed products from these vendors, and what effect does this and product support have on the actual applications of these products in its business?

Examine and review the contracts that are in force. It has been common for vendors of major equipment items, such as private branch exchanges, to give as much as 10 years' notice before dropping support. However, long before dropping support, refurbished replacement parts may be substituted for new ones by the vendor because it has discontinued manufacturing them and new ones are no longer available (customers are informed of this in advance). Because of the merger, a vendor may not wish to renew its contracts.

If the user company is in the process of buying additional products from the merging parties or plans to in the future, the procurement should be put on hold pending a complete review of the situation.

Another aspect of the user organization's relationship with a telecommunications vendor is the service requirements. Do either or both of the vendors involved in the merger have a team that is continually on the company's premises, or is on-call service with four- to 24-hour response time sufficient? Are the skills of the in-house staff greatly different from those the vendor supplies or is it more of a manpower and economic issue?

Companies tend to differ widely in their experience with obtaining telecommunications staff; thus, staffing options that are available to the network manager may already be predefined.

### Propose service changes

Users can have a great deal of influence on vendors. Having scrutinized the merger situation, network managers should assess their clout, identify ways in which the combined organization can better serve them and start talking. They should talk to the vendor's sales representative, ask their company's executives to contact the vendor's management and join with other users to convince the newly merged company to adopt their suggestions to better serve their organization or simply maintain the status quo.

The merger may present opportunities for new interfaces and interoperation between the merging entities' products. These may represent substantial benefits to users and may receive higher development priority if users make their wishes known.

For example, Paradyne customers might vigorously lobby for AT&T to support their modem network management system under Unified Network Management Architecture.

Naturally, these requests must be in keeping with the relative size of the company making the requests as well as their importance to this and other companies. For instance, only a company such as a General Motors Corp. could have issued a meaningful ultimatum to its vendors making them provide, in this case, a Manufacturing Automation Protocol interface in order to remain GM suppliers.

Another beneficial possibility is to qualify for larger volume discounts because of the user company's business with the two merging parties; if you've been doing business with both the merging vendors, you might get a larger discount. Sometimes credit for volume discounts can be negotiated across product lines. For example, in some situations, indi-

## What kind of merger?

There are many ways in which companies can merge. In fact, even the term merger can be suspect.

Actual takeovers or acquisitions are sometimes called mergers as face-saving political maneuvers to allay objections from regulators, customers, unions, competitors and government officials. Since the result for a net manager from either a merger or acquisition is essentially the same, we will treat both as having an equivalent effect.

Mergers and acquisitions are usually classified as vertical, horizontal or conglomerate in nature.

Vertical mergers involve the combining of adjoining entities in the value chain, such as a manufacturer merging with a distributor, as when Siemens Information Systems, Inc. acquired Tel Plus Communications, Inc.

Horizontal mergers involve firms that provide similar functions of the value chain. Although in some cases they may compete with each other, they aren't necessarily competitors. Siemens' merger with IBM/Rolm Systems Division and MCI Communications Corp.'s merger with Telecom*USA, Inc. were combinations of companies in the same businesses, whether they competed or not.

Conglomerate mergers involve businesses that may not have any direct value-chain relationship to each other, as with Unisys Corp.'s acquisition/merger with Timeplex, Inc.

The merging organizations may stay separate or combine completely or partially, either permanently or temporarily.

If the merging entities remain separate, some observers might think that this indicates a lack of commitment to the new enterprise and that one of the organizations might be chopped up, with its component subsidiaries and other assets sold off. Allowing the companies to initially remain separate may be management's method of monitoring performance and fixing responsibility.

In addition, it permits future separation with relative ease. For example, when Wang Laboratories, Inc. acquired InteCom, Inc., the firms remained separate; Wang later sold InteCom.

If InteCom had been completely combined with Wang and business expectations were not realized, for whatever reason, it may have been impossible for Wang to sell InteCom as a going concern.

However, a merger usually represents a loss of identity of one party and an irreversible bonding, such as with Tel Plus and Siemens.

Partial combinations generally indicate some restructuring to streamline operations, eliminate redundancy, achieve economies and separate specified activities.

*— Clifford Worth*

vidual Bell operating companies can combine central office and customer premises equipment purchases from vendors such as Ericsson, Inc., Northern Telecom, Inc. and Siemens, in determining volume discounts.

If the new organization can combine separate product lines with complementary functionality into a unified service solution, users will benefit through increased service efficiencies or new capabilities.

As examples, the Codex Corp. and Paradyne modem network management systems might be made to interoperate with their parents' systems — Motorola, Inc.'s radio management systems and AT&T's public network management systems, respectively. Troubleshooting and diagnostic activities that encompass network components from both parties of a merger might be quite valuable and should be made known to the vendors.

Finally, having assessed the merger and ascertained what actions the vendor plans to take, the net manager should undertake the process of making new arrangements to compensate for the changed environment.

Part of this effort might be to intervene in the regulatory process.

Most mergers are subject to some judicial review, and the user company may wish to participate, either on its own or through a trade association. An industry group has the advantage of reducing costs and keeping individual users anonymous, or at least on a low profile.

A good practice many user firms follow is to divide their business among a few key primary and secondary suppliers. During a vendor merger, the user may find it desirable to shift the mix of purchases between the primary and secondary suppliers or to replace them entirely. For example, AT&T's Tariff 12 contracts and those of its competitors are designed to provide the greatest price advantage when 100% of the customer's business is given to one supplier. Deals of this nature can be restrictive in a merger situation and should be considered before signing.

Perhaps the best advice is to think and talk fast but act more slowly.

Frequently, vendor mergers go through a long consummation process involving lots of internal battles to resolve many of the issues critical to users. Stay involved and listen carefully for statements of direction and their indicators.

At the same time, net managers must lay the groundwork for change and, when the time comes, move deliberately, shifting to alternate vendors over time or retaining independence by building up the capabilities of their own staff. Only then will a manager retain the flexibility to make the best of the situation — good or bad.

## Minimizing merger impact

**When your vendor merges:**

- Determine the nature of the merger and how it may affect your company by reviewing press releases and articles in trade publications.
- Assess your company's business relationship with the vendor by studying your support and service contracts.
- Propose product or service changes that will allow the combined organization to better serve your company.
- If necessary, make arrangements to compensate for the changed environment, such as through participation in a judicial review of the merger or the use of secondary vendors.

GRAPHIC BY SUSAN SLATER

SOURCE: ARTHUR D. LITTLE, INC., CAMBRIDGE, MASS.

# Letters

*continued from page 31*

vendors with token-ring cards certified by Novell than just Olicom.

Edward Murray
Director of North American operations
Madge Networks
San Jose, Calif.

*Author's response:*

*When the token-ring local-area network operating software article was being researched, Olicom's token-ring adapter was the only one Novell, Inc. had officially certified for use as a NetWare 386 server adapter, according to Novell. Since then, however, others have been certified and added to the list. Madge Networks, Ltd.'s token-ring adapters still are not certified for use with NetWare 386 servers.*

*The statement in the article that Olicom's is the only adapter Novell has certified for use with NetWare should have noted that this pertained only to NetWare 386. Regrettably, it did not. The chart, however, did carry the note (under "Adapters supported" for NetWare 286) that other adapters besides the two vendors listed in the article were also supported. Space limitations didn't permit listing them all, even if Novell had provided an up-to-date, comprehensive list, which it did not.*

*A token-ring adapter certified for use with NetWare 386 means that the vendor's adapter driver incorporates Novell's Open Datalink Interface, which is key to the Network Loadable Module multiple protocol capability that is a cornerstone of NetWare 386.*

*This capability applies to the NetWare server adapter only. According to Novell, any client/workstation token-ring adapter driver that works with a NetWare 286, Version 2.15 server will also work with a NetWare 386 server.*

*Similarly, although the adapter drivers certified for NetWare 386 servers were tested on Version 3.0, Novell says they will also work on the recently introduced Version 3.1, as well as with subsequent releases of NetWare 386.*

*In the case of Novell's certification of IBM, IBM did not submit its driver or adapters for official Novell certification. Novell, nevertheless, determined that adapter compatibility with IBM in the token-ring environment was critical. So Novell wrote its own driver for use with IBM's adapters, the combination of which it then certified.*

*Hope this clears up the issue.*

*Edwin Mier*
*President*
*Mier Communications, Inc.*
*Princeton, N.J.*

*Novell's response:*

*Novell's independent manufacturers' support program tests third-party and Novell-developed local-area network driver products.*

*As of July 20, Compaq Computer Corp., Gateway Communications, Inc., Madge Networks, Ltd., Memorex Telex, NCR Corp., Racore Computer Products, Inc., Sytek, Inc., 3Com Corp., Ungermann-Bass, Inc. and Western Digital Corp. have all certified their token-ring adapters for use with NetWare 286 servers. In addition, Compaq, IBM, Olicom and Proteon, Inc. have all certified their token-ring adapters for use with both NetWare 286 and 386 servers.*

*This list covers all token-ring LAN drivers that are certified to date. Furthermore, please note that, through Novell, Madge has certified the following token-ring products for use with NetWare 286: Smart ISA Ringnode, Smart AT Ringnode, Smart MC Ringnode, PC Ringnode RPL and AT Ringnode RPL.*

*I hope this clears up any misunderstandings.*

*David Owen*
*Vice-president*
*Novell, Inc.*
*Provo, Utah*

# Pro

*continued from page 31*

major TV networks, and the over-the-air broadcasting industry gets nothing in return.

■ The Cable Communications Policy Act of 1984, which outlawed state and local regulation of basic cable rates and legislatively mandated the FCC's telephone company/cable TV cross-ownership ban. In addition, this act stated that cable TV companies could not be regulated as common carriers.

As a result of these pro-cable policies, cable TV is now poised to dominate both the home entertainment industry and the distribution of switched video to businesses in the U.S., almost totally free from any meaningful competition.

Cable is big business today. Since its infancy in 1970 when it had 4.5 million subscribers, cable has increased its number of basic subscribers by 13.8% per year, to its current level of around 54 million.

Associated with this increase in cable subscribers has been a decline in the three national TV networks' share of the audience. The shift from broadcast program viewing to cable program viewing has increased the financial pressure on network broadcasters. This year, the cable TV industry is expected to gross $18 billion, and *Broadcasting* magazine recently valued the industry at $90 billion — more than twice the value of the TV broadcasting business, which is worth about $40 billion.

Today, cable TV is dominated by a small number of major companies known as multiple system operators (MSO). In fact, approximately 33% of all subscribers are served by the two largest MSOs and their affiliated companies, Tele-Communications, Inc. (TCI) and Time-Warner. The next eight largest MSOs serve almost 25% of all cable TV subscribers.

Consequently, the top 10 cable TV MSOs provide service to almost 60% of all cable TV subscribers in the U.S. In other words, the cable TV industry in the U.S. is heavily concentrated, is free from regulation and has little or no competition.

Finally, public policymakers are expressing their fears about cable's great economic and political strength. Sen. Howard Metzenbaum (D-Ohio), chairman of the Senate Antitrust Subcommittee, has spoken out against the dominance of TCI and Time-Warner.

"The cable industry is in the midst of a rapid period of horizontal concentration and vertical integration," Metzenbaum says. "Until recently, public policy in this area sought to separate control over the conduit of information from control over the content of information. We have strayed far from this principle without any systematic examination of whether such a departure is warranted."

One answer, it seems, is to consider the promotion of competition for cable TV. A contender for this is wireless cable, otherwise known as Multichannel Multipoint Distribution Service, which delivers multiple signals via microwave. Another solution is to finally lift the 20-year prohibition on telephone company distribution of video signals.

For its part, the cable TV industry would much rather submit to reregulation and even some limited competition from wireless cable than permit the telephone companies to install optical fiber for the delivery of full-motion switched video, data and voice to every home, office and public building in the U.S.

Leaders in the cable industry claim that the telephone companies will lose their "$400 billion shirts" if they are allowed to get into cable, meaning that the telephone companies will have to pay as much as $400 billion to install fiber in the local loop and that the investment will be useless because cable TV is already doing a great job.

Other critics of telephone company entry say that the telephone industry, which is built around a public switched network, is not currently able to cope with universal full-motion switched video when the average TV set is in use for more than seven hours a day.

David Leach, a senior aide to Rep. John Dingell (D-Mich.), chairman of the House Energy and Commerce Committee, asks, "Can the telephone industry cope with this dramatic increase in demand — 90 million-plus TV households with multiple sets in almost constant use?"

The telephone industry says it is ready to offer full-motion video, via optical fiber, and can handle the technical difficulties and the financial risks. The regulators — city, state and federal — say they are tired of cable's whining and its crybaby approach to competition, real or imagined.

The solution, therefore, is to unleash the competition. Let the telephone companies into the market, subject to regulation at the city, state and federal levels, and see what happens to cable TV service and rates. I suspect that service will improve quite dramatically and rates will come down to reasonable levels.

Clearly, this competition could result in mergers and acquisitions by telephone companies of existing cable TV systems. However, to ensure competition and protect customers from rate-gouging, the FCC and Congress could rule that any such mergers must be approved by the FCC and the Department of Justice.

If the cable industry continues to insist that the telephone companies should be excluded from offering video, then the policymakers should reregulate cable at the city, state and federal levels. There should be no procrastination; it should happen right now.

## Con

*continued from page 31*

forces to create Cable Television Laboratories, an industrywide research and development facility designed to produce technological advancement.

One of Cable Television Labs' major initiatives is further development of fiber for cable use. The industry's soaring use of fiber promises an evolution toward high-definition television and greater interactive capacity.

In addition, progress in digital compression technologies will yield even higher channel capacity for the increasing number of programming services entering the market.

None of these trends should be surprising; they've been a staple of the cable industry for several decades. However, the key point is that this momentum is being driven by users in the marketplace and *not* by subsidies from telephone ratepayers or the federal government, which is what the entry of telephone companies into cable would produce.

Advocates of telephone company entry into cable have fallen victim to the perception game. They've been convinced by someone that the unfavorable anecdotes we hear about cable accurately describe that whole industry. That same someone wants to convince Congress and the public that there is something fundamentally wrong with our telecommunications infrastructure and that they are just the ones to put it right.

I'm talking about those great companies that have tilled the fields of government-guaranteed profits for many years. When they were all part of one company, they were called "Ma Bell." Now the seven component parts are more ominously powerful than they were under one roof. We should refer to them as "Big Mother."

Big Mother's view of the future — which she advocates as "a single wire to the home" — validates the vision George Orwell expounded in his novel *1984*.

"Just eliminate the shackles that prohibit us from entering the field of mass distribution telecommunications so that we can add that to our present capability of customized distribution," Big Mother swoons. "We can spend a mere $200 billion to $500 billion to rebuild the entire infrastructure of telecommunications in the U.S. for the 21st century."

But the telephone company's customized distribution system is a different animal from a mass distribution system such as broadcasting, direct broadcast satellite or cable television. The current telephone central office isn't designed to handle more than 20% of the telephone customer base at any given time. However, the cable system is designed to provide service to 100% of the subscribers all of the time.

It's time to expose the myths about the telephone infrastructure and the folks who run it. Big Mother can't possibly afford to build a system that has 100% point-to-point switching capability. Yet she has convinced some members of Congress that if we let her spend billions for a magic fiber infrastructure, she will be able to provide point-to-point video on demand.

## Whose interests does Big Mother really represent?

▲▲▲

The shifty promises and cunning doublespeak of Big Mother telephone are nothing new. Recent history is littered with examples of these deep pockets run amok, often working to enhance profits rather than the lives of their customers.

Take the case of Nynex Material Enterprises Co. It took an investigative reporter to prod the government into making the discovery that this supposedly separate Nynex Corp. subsidiary had inflated the price of the goods and services it sold to Nynex by $118 million. The government says nearly a third of that amount was charged to Nynex customers for long-distance interconnection. Nynex says it's all just an accounting problem.

In addition, Southwestern Bell Corp. reportedly has now acknowledged misallocating $19 million in ratepayer money during the last five years for government lobbying.

The telephone companies are notorious for shady business practices. This spring, the U.S. Treasury Department temporarily barred Bell Atlantic Corp. and The Chesapeake and Potomac Telephone Co. from telecommunications procurement contracts, citing fraud, misrepresentation and an "absence of business integrity." The charges stemmed from bidding procedures on a large digital equipment contract.

The Florida Office of Public Counsel has been seeking telephone company documents in a rate case. An attorney in the office says he's had an ongoing battle with Southern Bell Telephone and Telegraph Co. to obtain the documents he needs for the case. Meanwhile, telephone company executives have been telling Congress how happy they'll be to cooperate with federal auditors — already woefully outnumbered — to guarantee so-called safeguards against cross-subsidizing new services.

Are these the kinds of companies that should be offering users video distribution? Are these antics the pro-consumer practices that should usher in the bright future of switched video programming? Congress, the press and the public should take a hard look at Big Mother. Whose interests does she really represent?

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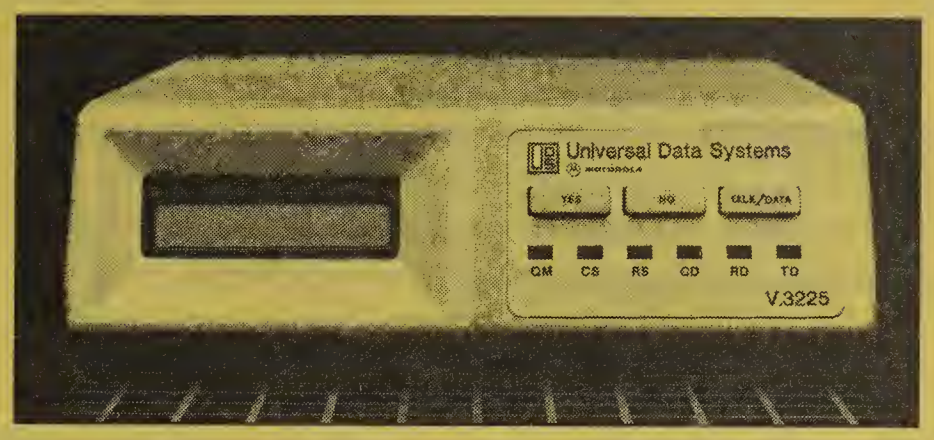


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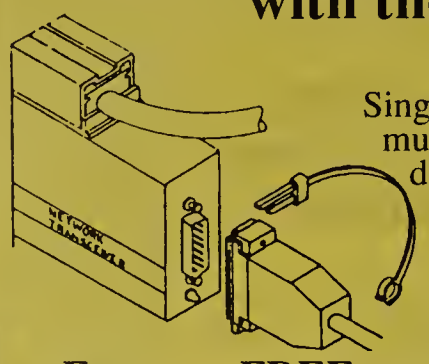

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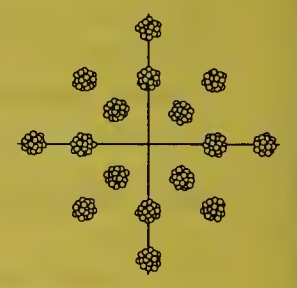

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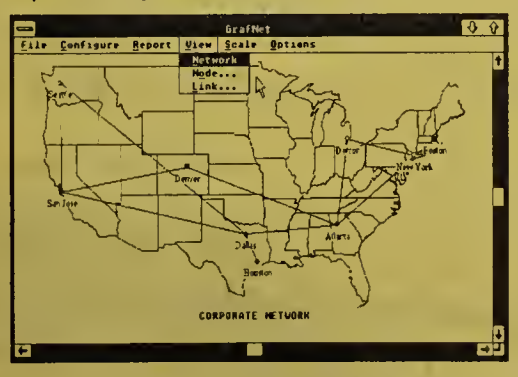


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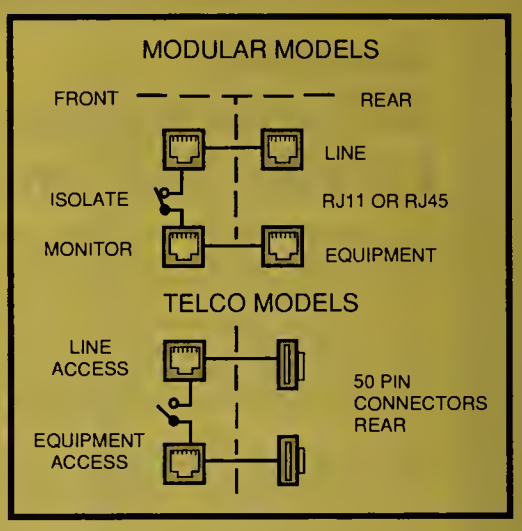


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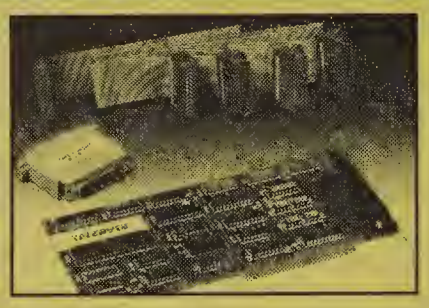

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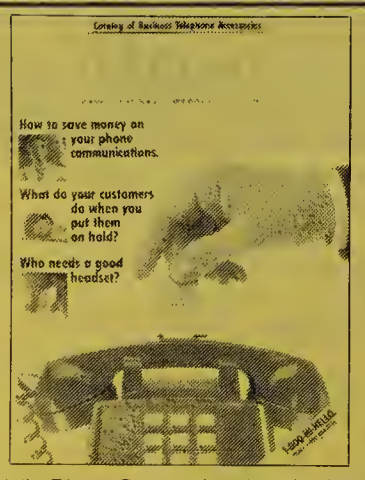


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# Competition up for X terminals

*continued from page 1*

81% annually through 1994, said Eileen O'Brien, director of IDC's Terminal Services.

The lower revenue growth reflects the expectation that X Window terminal prices will drop significantly because of increased competition and declining production costs.

The market is expected to grow so dramatically because X Window terminal graphic workstations fill a niche in between cheap ASCII terminals and high-cost personal computers. X Window terminals typically cost about $2,500.

"For us, it turned out to be more cost-effective to use the [million instructions per second] and memory on a server [supporting X Window terminals] than on workstations," said Rich Vanderdrift, vice-president of financial applications at Oracle Corp., a San Mateo, Calif.-based data base software firm. Oracle has tied about 200 X Window terminals to many servers to support software design engineers.

"While the cost of the X Window terminals is five times that of a dumb terminal, we can justify them based on the increased productivity we get from windowing and applications that support graphical user interfaces," Vanderdrift said.

Oracle is a customer of Network Computing Devices, Inc. (NCD), a Mountain View, Calif.-based firm that holds the early lead in the X Window terminal market.

NCD sold about 6,000 X Window terminals last year and expects to sell 30,000 this year and 80,000 next year, according to Bill Carrico, the company's president and chief executive officer. NCD offers a range of X Window terminals featuring both monochrome and color monitors.

Before this year, NCD's major competitor was NCR Corp. But the market entrance this year of major new players such as AT&T, Digital Equipment Corp., Hewlett-Packard Co. and IBM may change that.

In February, IBM announced its Xstation 120, a $2,200 device the company describes as "a lower cost alternative to an intelligent workstation on a local-area network."

DEC, the firm that Carrico predicted will be his company's toughest competitor given its strength in the terminal market, unveiled the VT-1000 Windowing Terminal in March at a price less than $3,000.

Also in the first quarter, AT&T began offering its 730X X Window terminal and HP delivered its first X Window terminals. HP last month introduced its second generation of X Window terminals, dubbed the HP 700/X family of X Window Terminals.

Unisys Corp. and Wyse Technology are among the notable players expected to join the X Window terminal market later this year, according to Stephen Auditore, president of The X Business Group, a market research firm in Fremont, Calif., that focuses on the X Window System market. There are now 24 X Window terminal vendors, he said.

All in all, the growing activity in the market is good news for users, industry watchers said.

"It's significant that the big guys have come in and blessed the market," O'Brien said. "These large vendors will spur the price curve to come down and get software developers interested [in developing X Window host applications]."

Pat Parseghian, computer systems manager at Princeton University's Department of Computer Science, which has invested in 71 X Window terminals from NCD, agreed. "I'd expect competition to have its usual effects; it will help drive prices down and encourage more innovation," she said.

Parseghian said that when her department recently moved, it decided to standardize on X Window terminals instead of workstations, which were considered too expensive.

Some observers said NCD's announcement last month that it was lowering prices on selected X Window terminal models is evidence that price competition may have already started.

But others contend that this type of shift is simply made possible by product evolution and questioned whether the entrance of large systems vendors into the market will have much of an effect on prices.

John McCarthy, director of Cambridge, Mass.-based Forrester Research, Inc.'s Professional Systems Service, said many system vendors regard X Window terminals as simply "a checkoff item" that they must offer but into which they won't bother putting too many resources.

Jack Dunenberg, district manager of display terminals at AT&T in Naperville, Ill., said competition in the X Window terminal market will force vendors to develop better features and functionality more than it will force prices down.

"I think you'll see a lot of new X [Window] terminal products over the next year or so, and I expect they'll offer better performance and ease of use, among other features," Dunenberg said.

One of the new features introduced by NCD last month in an effort to maintain its industry lead was support of the industry-standard Simple Network Management Protocol on its X Window terminals. Additionally, NCD plans to announce support for DEC's Local Area Transport protocol this summer, NCD's Carrico said.

"We know we can't rest," he said.

# Utilities glow over meter tests

*continued from page 15*

systems so that utilities can pinpoint problems on their electrical nets and route around or fix them before an outage occurs.

Boston Edison, meanwhile, is deploying its ServiceNet network underneath city streets in a crowded downtown area here, said Wayne Lemmerhirt, project manager of ServiceNet.

"The problem downtown," Lemmerhirt said, "is that there aren't a lot of places to put radios." Boston Edison does not have the rights-of-way to install radios on streetlights or most rooftops, he said.

Another problem is that power lines generally run underground in urban areas and transformers, rather than sitting atop utility poles, are placed in underground vaults. Covering the vaults are large iron grates on the sidewalk.

Boston Edison has devised a way to embed a radio antenna in the grates, allowing radio waves to transmit from one vault to another. Using the Metricom modem, data is transmitted to the radios from meters at customer sites over power lines.

Transceivers in the vaults convert the transmission to a spread-spectrum signal, a low-frequency radio technology that can support numerous transmissions in the same area. Signals hop from one vault to another or, in some areas, to rooftop-based antennas until they reach a computer at a central data collection point.

Boston Edison currently has antennas installed at two of its vaults and is having more built to outfit 27 vaults by the end of August, said Priscilla Korell, senior communications specialist for the company. The company plans to install 1,000 meters and 500 radio transceivers in the downtown test bed, Lemmerhirt said.

Meanwhile, the residential portion of Boston Edison's ServiceNet project has moved from the demonstration phase to pilot status, with almost half of the planned 500 transceivers and 1,000 meters installed in the Boston suburb of Newton, Mass., Korell said. Both ServiceNet trials will continue for another full year, and Boston Edison said it expects to decide in October 1991 whether to fully implement the system.

### Pilot changes course

Southern California Edison, meanwhile, has expanded its pilot project, dubbed NetComm, from the original test site of Valencia, Calif., to Monrovia, Calif., said Spencer Carlisle, senior research engineer for the company.

At Valencia, Southern California Edison has 1,000 meters and 225 transceivers installed. The thrust of that test is to support automated reading of Metricom meters, which — unlike the mechanical meters they replace — can supply information such as diagnostic data to determine the health of a circuit and usage data according to time of day.

The Monrovia test, which involves another 120 radios and 100 meters, will test the electrical distribution and circuit monitoring and control capabilities of NetComm, Carlisle said.

Today, utilities for the most part rely on customers to call and inform them of power failures. The Monrovia test will demonstrate NetComm's ability to support applications that monitor and control devices such as the switch capacitors that regulate voltage and power flow and the disconnect switches used to isolate faults and contain outages.

A number of other applications have already been successfully demonstrated at Valencia, Carlisle said, such as the ability to broadcast a signal that cuts the power supply to thousands of air conditioners. Such capabilities support new billing options that utilities are devising, including one under which customers agree to let the utility cut power to some major appliances during peak power use periods in exchange for a favorable rate.

Southern California Edison has also demonstrated the ability to link to NetComm from laptop computers in service trucks by sending a signal from a truck-mounted antenna to a nearby radio transceiver, Carlisle said. Once that's done, crew members can read meters at any point in the network to check voltage at a remote point and tweak a regulator accordingly, for example.

Both Carlisle and Lemmerhirt said it's possible their networks may one day be shared by gas and water companies.

PG&E, being both an electric and gas company, is tailoring its system to read both types of meters.

Currently, more than 300 meters and nearly 200 radios are installed, but the company is waiting for Metricom to deliver meters capable of delivering data on gas and electrical lines.

# Help desks evolve

*continued from page 22*

see expert system-based problem determination tools as a way to bring untrained help desk candidates up to speed.

Sherry Lessner, manager of information development and support at System One Corp., which provides systems and network support for Continental Airlines, Inc., said the use of expert systems will enable her to reduce the time it takes to train entry-level help desk operators from six months to six weeks.

Lessner is beta-testing an expert system-based problem management software package, known as Helpdesk Expert Automation Tool, from Bendata Management Systems, Inc.

Expert systems walk support personnel through a series of questions they can ask end users to determine the source of the problem and then instruct the operator how to correct it. "The use of expert systems will revolutionize help desk operations," Lessner said.

When combined with advanced network management tools such as AT&T's Accumaster Integrator, which provides an end-to-end view of network components and alarms, help desk personnel will be able to resolve a majority of user problems, according to help desk managers.

Already, many companies report that their help desks can resolve from 65% to 80% of the end-user problems.

For many companies, the help desk has become a critical asset in their efforts to improve service and quality throughout the organization.

Many managers now recognize that help desks play a critical role in shaping end-user attitudes and ensuring an efficient workplace.

"The help desk is the first point of contact end users have with the data center," said ICI America's Fahey. "Therefore, it's critical that we address their needs and satisfy their requirements."

### At the center

To illustrate the importance of the help desk, Fahey redesigned the firm's data center so that the help desk is physically in the center of operations.

Similarly, System One refers to its help desk as a service center in order to reinforce the notion of customer service and responsiveness, Lessner said.

"In the past, help desks were established to buffer computer operators from customer calls. Now we want to be proactive. We want to be able to identify and correct customer problems before they happen," Lessner said.

For senior executives who want to improve quality, help desks also are repositories of information about the firm's operations. Executives can examine help desk logs to identify bottlenecks in the company's operations that may be undermining service and reducing efficiency.

"Many senior executives now realize they need to emphasize service within their organization if they want to use service as a competitive weapon in the marketplace," said The Help Desk Institute's Muns.

# Infonet to offer flexible service

*continued from page 1*

to Infonet's packet network.

Infonet will establish different monthly charges for each customer, depending on the number and location of user sites in a configuration, according to James Heerwagen, a product marketing manager for the company.

In general, however, the cost per Vmesh access line for communications within a single continent will run between $1,125 and $2,000 per month. The monthly cost per access line for Vmesh networks spanning multiple continents will be between $2,500 and $3,100.

Vstar, which Infonet introduced last spring as Virtual Private Network+ and is now bundled into VPDN, is a similar flat-rate pricing plan for packet networks linking multiple remote devices to a central host.

Basically, Infonet hikes the cost of the dedicated host access line to compensate for the loss of data volume charges.

For example, Heerwagen said the fee for a 9.6K bit/sec Vstar host access port supporting communications within a single continent is about $8,500 per month. The charge for a 14.4K bit/sec Vstar host port supporting communications between two or more continents is about $35,000 per month.

Access line charges for remote devices will remain the same as they are in a standard packet-switching service.

Infonet's packet-switching network has more than 145 domestic and 35 foreign nodes.

### T-1 backbone network

The new Vstream offering will enable users to obtain circuit-switched capacity on Infonet's internal T-1 network, the backbone of the company's packet-switched network. According to Heerwagen, this network is supported by about 15 Network Equipment Technologies, Inc. Integrated Digital Network Exchange (IDNX) T-1 multiplexers, roughly half of which are in the U.S. and the rest of which are in Europe.

Vstream charges will vary widely and will reflect the cost of local access and capacity used on the T-1 backbone, as well as management and maintenance services and equipment leases. For example, a 56K bit/sec circuit from a major European city to a major U.S. city on the East Coast would run about $14,000 to $19,000 per month. A similar 9.6K bit/sec circuit would cost between $4,000 and $7,000 per month.

Infonet will mix and match VPDN service components to design custom networks for customers.

For instance, one of the first VPDN customers, Storage Technology Corp. in Louisville, Colo., is using two 9.6K bit/sec Vstream circuits to link its headquarters to offices in England and France, and a Vstar to support communications among eight offices in Australia, Europe and Japan. The company claims the network is reducing monthly expenditures by $20,000 over the standard Infonet packet-switching services it used previously.

To help customers manage VPDN networks, Infonet is introducing Network Control Center-PC, software for IBM-compatible personal computers that collects alarms from Infonet's network control center via a dedicated connection to an Infonet node. Heerwagen said the service will cost about $700 a month.

# Reps instruct GAO to probe FCC

*continued from page 4*

several major legislative or regulatory efforts, including freeing the regional Bell holding companies from Consent Decree restrictions, lessening regulation for AT&T and allowing telephone companies to purchase cable franchises.

In a joint letter, Markey and Synar stated that several industry events had prompted them to seek the GAO review.

They pointed out that the FCC has recently uncovered several examples of RBHCs improperly shifting resources from the telephone unit to unregulated ventures or inappropriate activities.

In February, the FCC charged Nynex with funneling money between its regulated and unregulated activities. The agency said Nynex officials required the telephone unit to purchase goods and services, funded by ratepayers, from an unregulated subsidiary at inflated rates, resulting in Nynex overcharging. The FCC said Nynex had overcharged ratepayers $120 million over four years.

Also, in testimony before Congress in March, FCC Chairman Alfred Sikes said the commission was investigating three other examples of cross-subsidization in RBHC operations. He declined to name those under investigation.

Markey and Synar said they were also concerned about a decision by the FCC last June that disallowed $900 million in costs it said the RBHCs were improperly trying to add into the rate base. Some of those costs were for RBHC lobbying efforts.

While the FCC did uncover these improprieties, some critics complain that the discarded costs are just the tip of the iceberg. They argue that the FCC failed to probe deeper to unearth other inappropriate costs the RBHCs are including in their rate bases.

Another cause for concern cited by Markey and Synar was a recent California appeals court decision that overturned the FCC's Third Computer Inquiry decision. Computer III eliminated the requirement that the RBHCs offer enhanced services through a separate unit as a check against cross-subsidization and instead established accounting rules designed to prevent cross-subsidization. That ruling casts doubt on whether FCC rules to detect cross-subsidies are adequate.

> Some critics complain that the discarded costs are just the tip of the iceberg.
>
> ▲▲▲

In 1987, at the request of Rep. Tim Wirth (D-Colo.), the GAO conducted a study of the FCC's ability to enforce cross-subsidization rules. That report concluded that the FCC's level of oversight was not adequate to guarantee ratepayers or competitors that they would be protected from carrier cross-subsidization.

Markey and Synar are asking the GAO to update that report by studying whether the FCC's oversight capabilities have improved.

An aide to Synar said the congressmen hope to have the report before year end. She added that if the GAO finds the FCC's oversight capabilities have not improved, any legislation on freeing the RBHCs from the Consent Decree may be stalled or eliminated.

The congressional inquiry comes at a critical time for the RBHCs. Markey unveiled a draft of legislation he may introduce that would allow the RBHCs to manufacture telecommunications equipment and provide information services. The draft was first circulated in February, but Markey has yet to officially introduce the bill.

In the U.S. Senate, a bill that would allow the RBHCs to manufacture equipment was passed by the Committee on Commerce, Science and Transportation, headed by Sen. Ernest Hollings (D-S.C.). An aide to Hollings said it is unlikely the bill will be voted on before Congress recesses in August and it is unclear what schedule the bill will be on once Congress returns.

If the GAO report fails to give the FCC a clean bill of health on its oversight activities, congressional efforts to allow the RBHCs into new service areas and to switch oversight to the FCC could be stalled. To further complicate matters, Sikes recently said the commission's budget could be cut up to 25% due to the Graham-Rudman-Hollings Act.

# DEC posts loss of $257m for 4Q

*continued from page 8*

DEC reported revenue of $12.9 billion for the year, up 2% from $12.7 billion last year. Sales of computers and other products fell 8.4% in the quarter, hurt in part by the slow introduction of DEC's new VAX 9000, while service revenue inched up.

John Smith, senior vice-president of operations for DEC, attributed the company's disappointing financials in part to "the continuing economic slowdown that affects the U.S. and other markets."

Smith said the company is "not satisfied with our operating results and will continue focusing on revenue growth and reducing our cost structure."

One way to cut costs is to eliminate jobs, he said. DEC, which has about 124,000 workers, plans to reduce that number to about 119,000 under a work force reduction/severance plan.

DEC's cost cutting and growing emphasis on providing networked computers should lead to improved results in the next few quarters, analysts said.

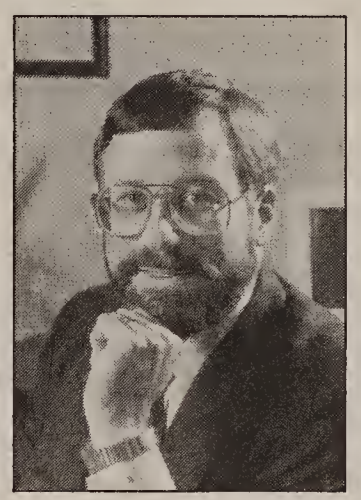
Among DEC's most promising network offerings is the new model of its VAX 4000 computer, which fits into DEC's client/server computing strategy and can be configured as a local-area network server or as a minicomputer in DECnet environments. DEC received orders for about 1,000 computers in the last few weeks of the fourth quarter.

"Networking is going to play an important role in DEC's efforts to succeed in the long run," said Cliff Friedman, a vice-president at Bear, Stearns & Company, Inc., a New York investment firm.

# NET reports operating loss

*continued from page 4*

considered, may have been hastened by the latest financial results, an NET executive said. Smith will hand over his CEO duties to Daniel Warmenhoven, who joined NET as the company's president and chief operating officer in November 1989. Previously, Warmenhoven headed the Information Networks Group at Hewlett-Packard Co.



Bruce Smith

Smith, who co-founded NET, will remain chairman of the board until Dec. 31, after which he will pursue venture capital activities while continuing in a consulting capacity with NET.

In a related move, Barry Roach resigned as chief financial officer at NET. He also stepped down from his seat on NET's board of directors and gave up his titles as secretary and vice-president of finance and administration. Roach, who will serve as a consultant to NET, resigned so Warmenhoven could pick his own management team, said Bob Bressler, vice-president and chief architect for NET. Craig Gentner, who joined NET from Xidex Corp. in August 1989 as vice-president of finance, was elected vice-president and chief financial officer.

Michel Guite, a vice-president at Salomon Brothers, Inc., an investment firm in New York, said, "I see this as NET's attempt to move from start-up company management to a larger company management structure."

NET said it hopes that a revised management team also will help restore confidence in the company. Bressler added that NET is also attempting to reassure customers by making frequent visits.

"We're explaining to customers where our architecture is going, where our R&D is headed and what we think are the key areas in networking," he said.

One promising sign for NET is that it was still pumping extra dollars into research and development, as well as investments in its sales force during the first quarter, said George Kelly, vice-president and securities analyst at Morgan Stanley & Co., a New York-based brokerage firm.

"NET's R&D spending and compensation to its sales force was higher than I thought it would be," Kelly said, "but it's when a company starts slashing spending on its sales force and R&D when you get worried. NET's spending should be reassuring to customers."

Analysts said the increased R&D spending indicates the company is readying a product barrage. Among those products expected to be introduced later this year include IDNX offerings that support local-area network/wide-area net communications and fast packet switching, as well as a channel extender offering.

John Robinson, senior director of telecommunications operations at CSX Technology, an NET user in Jacksonville, Fla., said he will keep an eye on how NET tries to come back from its big quarterly loss under new management. "We have 35 NET nodes, so we have a lot riding on this company," Robinson said. "I feel buffered from NET's problems, however, in that we buy NET products from IBM."

# Microsoft spells out plans

*continued from page 2*

look on Professional Computing" in Santa Clara, Calif.

Microsoft's profitability could slide quite a bit and still look good. In the five years since the company went public, net income as a percentage of sales has risen steadily from an already high 19.9% in fiscal 1986 to an amazing 23.6% in the year just ended.

LAN Manager is evidently to become a primary beneficiary of this achievement. As Bill Gates, Microsoft cofounder and chairman, bluntly told analysts last week, the "high-speed bootstrapping" of the company's network business will require an investment in marketing and development "that is nonlinear to sales."

In other words, don't expect the added costs to produce heavy LAN Manager sales anytime soon. As new company President Mike Hallman put it, the contribution of Microsoft's network business to fiscal 1991 revenue is expected to be modest at best.

Meanwhile, the company is hiring 125 more systems engineers who will be dedicated to networking products, establishing a brand-new sales and support staff of 400, pumping $16 million into marketing efforts and providing its new net dealers with complementary training and a year of free support.

Microsoft officials declined to say exactly how much all this will cost, but the total would clearly make the $10 million launch of Microsoft Windows 3.0 look miserly by comparison.

Domestically, Microsoft plans to authorize 600 key network resellers under its Network Specialist Program. Just how many have signed on the dotted line was not revealed, but more than 1,000 dealers have already applied, according to Steve Ballmer, senior vice-president in charge of Microsoft's systems software business.

Signing up dealers and getting them to sell LAN Manager are two different things, though. Microsoft would like to recruit the best of Novell's blue-chip dealers and gain the benefit of their years of experience, but LAN Manager will have to offer some clear advantages over NetWare before the dealers can be expected to take on a proactive sales role.

One factor Ballmer said he expects will appeal to dealers is the way Microsoft has packaged and priced LAN Manager. The basic package, which costs $995, contains the server software and supports five concurrent users. Additional concurrent users can be added in increments of 10 for $995, and an unlimited-user license costs $5,495. By contrast, Novell differentiates the various NetWare options by server features, he said.

John Dunkle, vice-president of Work Group Technologies in Hampton, N.H., praised Microsoft's packaging but expressed concern. "The technology in LAN Manager 2.0 will be good enough to compete with NetWare, but it can't ensure success."

To be successful with LAN Manager, Microsoft should leave the network administrators to Novell and concentrate on courting the MIS departments, he said. "Microsoft needs to take advantage of its partnership with IBM because MIS is going to sanction a joint IBM/Microsoft product."

# FDDI links to extend distances

*continued from page 2*

separate VAXes with the same application so that one VAX can take over processing chores when another VAX fails.

Bill LaVigne, marketing manager for DEC's VAXcluster systems group, said it will take about a year for DEC to develop and test the device driver.

Using FDDI to interconnect VAXes in a VAXcluster is an alternative to using DEC's existing Computer Interconnect (CI) interface boards and Star Couplers. CI boards provide a coaxial cable link to a Star Coupler located up to 150-ft. away. Star Couplers act as hubs that route data between VAXes in a VAXcluster at 140M bit/sec.

While users lose speed using FDDI over present VAXcluster technology, they gain the ability to locate VAXes up to 62 miles from each other as long as users place DECconcentrator 500s to act as repeaters once every 1¼ miles. This is far beyond the current 150-ft. limit of VAXclusters.

LaVigne said FDDI can currently replace Ethernet as the transmission medium between MicroVAXes and DECstations running DEC's Local Area VAXcluster (LAVC) software. LAVC enables MicroVAXes and DECstations to be configured as a low-end VAXcluster.

DEC said FDDI can also enable customers to configure multiple VAXclusters within FDDI's 62-mile range as a single VAXcluster. This will enable users to manage the single VAXcluster from a central location rather than from separate management facilities collocated with each VAXcluster, LaVigne said. Previously, VAXes outside the 150-ft. range of a Star Coupler had to be configured as separate VAXclusters.

Several customers briefed about FDDI's role in VAXclusters at DECworld '90 showed interest in using FDDI and VAXcluster software to build disaster recovery into their networks, LaVigne added.

Users contacted by *Network World* agreed with this contention.

"Something like this will give us a lot of flexibility to reconfigure on the fly," said Leslie Maltz, director of computing and communications resources at Stevens Institute of Technology in Hoboken, N.J. The school has four VAXclusters in the same room, and interconnecting them via FDDI could be a way to support redundant processing that is not currently available.

For instance, a VAXcluster attached to one port on a DECconcentrator 500 can detect when a VAXcluster attached to another DECconcentrator 500 port fails and can then automatically take over processing chores. "This will have us back in business a lot sooner than if we had to physically recable VAXes between Star Couplers," she said.

Phil Demar, network analyst at Fermi National Accelerator Laboratory in Batavia, Ill., said the research lab is going to use FDDI to replace Ethernet as a backbone network and may examine using FDDI to interconnect both its high-end VAXclusters and its LAVCs.

"FDDI is the logical extension of where networking is going," Demar said.

# IBM execs open up on net issues

*continued from page 1*

components, but has sometimes come under fire for not adequately supporting non-SNA devices.

In recent months, IBM has taken steps to address those concerns. One example is NetView support for the OSI net management protocols in the IBM OSI/Communications Subsystem.

The company has also announced plans to support the Simple Network Management Protocol (SNMP), which is used to manage devices on Transmission Control Protocol/Internet Protocol networks.

### OSI direction

"A good bit of what we expect to be doing in the future in the way of management system architectures is going to be directed toward OSI," said Mark Knittel, manager of network management systems at IBM. "Where we can exploit it, we will."

Today, IBM supports OSI Common Management Information Protocol (CMIP) and Common Management Information Services (CMIS) — the OSI net management protocol and verb set, respectively — through its OSI/Communications Subsystem, a mainframe software package. The subsystem lets NetView accept CMIP and CMIS data coming from networks based on all seven OSI layers.

Few vendors, however, have net management systems based on the full OSI stack. So in its effort to encourage manufacturers to build links into NetView, IBM now wants to give vendors of proprietary net management systems the option of developing NetView links using CMIP and CMIS tools that run over SNA transport protocols.

This strategy, which IBM is trying to get the OSI/Network Management (OSI/NM) Forum to bless, takes into account the installed base of SNA networks and the fact that many vendors already offer SNA gateway products. CMIP implemented over SNA would enable vendors to use existing gateways to support standard links to NetView and provide a gradual migration path to OSI, Knittel said.

That would be similar to CMIP over TCP/IP (CMOT), which is an implementation of CMIP on top of TCP/IP transport protocols.

The OSI/NM Forum has yet to act on IBM's proposal. Knittel said the strategy was a long-term IBM goal that will not likely come to fruition anytime soon.

He added that there are no plans to push for supporting SNMP over SNA.

"If we're going to introduce a new product and need new [net management] functionality, the first place I'm going to look is to OSI and find out whether it exists there. If it does, I'll exploit it," Knittel said.

### LU 6.2 looms on horizon

While CMIP and CMIS plans are long-term, NetView support for LU 6.2 should be announced this year, Knittel said.

LU 6.2 is used to communicate between programs, as opposed to other types of sessions such as LU 2, which is used to link terminals to hosts. Thus, use of LU 6.2 in net management could support new functions.

Net management applications can use LU 6.2 to talk to NetView today, but few do so because they have to be written to the Advanced Program-to-Program Communication/LU 6.2 application program interface (API) in VTAM, which requires comprehensive knowledge of VTAM, said Steve Holloway, an IBM advisory programmer for network management strategic planning.

IBM said it will introduce a new higher level API that will provide a base-level interface directly to NetView. "We expect a lot of vendors to step up and use that," Knittel said.

LU 6.2 promises to foster development of more sophisticated network management applications because it supports greater throughput than other session types supported by NetView, and it has built-in features that will make it easier for different net management systems to interact, IBM executives said.

Use of LU 6.2, for example, could enable one net management application to invoke a response from another; that response could then trigger an action from the first application or from a third application.

LU 6.2's cooperative processing capabilities will also make it easier for NetView to work with workstation-based applications, Holloway said, including IBM's own NetView graphical interface.

Knittel said the company is committed to developing a graphical interface to NetView based on Presentation Manager that will run on OS/2-based workstations. The DOS-based NetCenter product IBM bought last year was a first step in the effort to give NetView an easy-to-use graphics front end, he said.

What LU 6.2 will not do is obviate the need for NetView/PC, which deals more with protocol conversion than with communications management. Non-SNA products will still need a mechanism for translating non-IBM net management protocols into a language NetView can understand. NetView/PC is one example of such a mechanism, which IBM refers to as a Service Point.

### Repository rears its head

As IBM succeeds in using mechanisms such as LU 6.2 to open up NetView to multiple vendors, it exacerbates the need for a repository that can store all net management data in a common format for use by various net management applications.

Knittel said IBM has two priorities in approaching the problem.

The first is to provide a consistent way to format data, be it data describing net configuration, inventory or devices in a network. "Before you can do anything else, you've got to have an idea of how the data ought to be represented," Knittel said.

The second priority is to move all that data to a state-of-the-art data base with a facility that allows interoperability and sharing between data bases.

He said that data base will most likely use SQL, which is supported by IBM's mainstream DB2 data base, but that the company has not yet decided whether it will use DB2.

He acknowledged that IBM's Repository Manager, a DB2-based product announced last year as part of IBM's AD/Cycle application development software, is a candidate for becoming the basis of the NetView respository, but he said the company is also examining other possibilities.

IBM's direction regarding the repository will become clearer in the near future and a repository announcement is possible by year end, Knittel said.

# FCC lets AT&T, RBHCs continue

*continued from page 8*

which have already begun offering all or part of their enhanced service operations through their telephone units.

Earlier this month, the RBHCs asked the FCC for permission to offer the services as usual until the agency can schedule a hearing to determine the impact of the appeals court ruling.

The RBHCs had told the FCC that putting enhanced service operations back into separate subsidiaries would require relocating equipment, hiring new personnel, renovating facilities, and moving and reinstalling network connections.

Based on the scope of changes that would have to be made, the FCC concluded "that it would not be feasible for the [RBHCs] to offer enhanced services on a fully separated basis immediately."

The FCC also pointed out that the appeals court ruling gives the agency an opportunity to establish a record to support the Computer III rule change.

"It appears unnecessarily disruptive to compel the [RBHCs] to put their enhanced services operations in separate subsidiaries for a short period of time, when the commission may decide to permit them to convert back to integrated operations," the FCC said in issuing the waiver.

Any potential harm to ratepayers arising from cross-subsidies between the regulated telephone services and enhanced services is small in comparison to the disruption customers would endure if services were suspended, the FCC said.

The FCC pointed out that it has safeguards in place to protect consumers from cross-subsidization.

# IBM develops prototype switch

*continued from page 4*

Layer 3 of the Open Systems Interconnection protocol stack, as do other packet-switching techniques. But Paris requires only the first and last nodes in a data path to look at the routing data, Murphy said.

A header attached to the packet at the first node details each intermediate node through which the packet must travel to reach its destination. As the packet traverses the net, each intermediate node merely strips off that portion of the header that identifies itself, then sends the packet on its way.

PHOTO ©1990 DUANE HALL/GAMMA LIAISON

**IBM's Charles Murphy**

This is a simple procedure that can be performed in hardware — a first in/first out (FIFO) buffer — as opposed to software implementations that exchange one address for another and require multiple buffers.

Traditional packet-switching architectures also implement routing at Layer 3 but require each node in the net to examine every packet. Both user and routing data are passed up to Layer 3 and then passed back down at each intermediate node, introducing delay.

Emerging fast packet techniques improve on that by shipping control information up to Layer 3 but actual user data only up to Layer 2.

Paris takes that one step further by eliminating the need to pass the data up to Layer 2. "As far as the two end points are concerned, this looks like a straight piece of wire," Murphy said.

The speed of a Paris implementation depends solely on the performance of the bus in the switching node that takes data from the FIFO buffer, according to Murphy.

The prototype switch, developed from off-the-shelf components including processor cards and a card cage, can switch one million to tens of millions of variable-size packets per second, he said.

By contrast, Murphy said, other emerging fast packet technologies switch 100K to 1M 48-byte cells per second.

If it does decide to develop products based on Paris, IBM intends to ensure they will interoperate with standard fast packet implementations, he said. In addition, IBM may decide to submit Paris for consideration as a standard.

**Switch's versatility**

Paris could be implemented in virtually any networking product IBM sells, such as front-end processors, Murphy said.

That relates to an idea IBM has already studied but rejected: putting T-1 multiplexing capabilities in its front-end processors. "For a couple of reasons — cost-effectiveness and time frame — we didn't feel that was the best solution," said Jack Baney, IBM manager of network management marketing.

The plan was to use technology from T-1 multiplexer maker Network Equipment Technologies, Inc., with which IBM has a strategic alliance, and put it inside IBM front ends. But IBM determined the engineering effort involved would have been too lengthy and costly to make the project worthwhile.

In related news, Baney said users could expect in six months to a year to see enhancements to the IBM 3745 family, including faster mainframe connections.

"You can configure the 3745 to support over 900 lines, so you need to enhance the throughput between the front-end processor and the [mainframe]," he said, "and I think you'll see that."

# IBM, hospital develop system

*continued from page 8*

100 documents, Hart said. This application could replace paper-based storage and retrieval of this information. "[Hospital officials] worked with us from the outset to develop a product we'd offer for general availability," he added.

The system is based on several components used in the existing ImagePlus system: an AS/400 9406 Model B30 or higher; IBM Personal System/2 Model 50 or higher end models equipped with a high-resolution monitor and image adapter card; and an optical storage subsystem that supports from 2G to 128G bytes. It can also include scanners and printers.

The system uses IBM's LAN Support Program, the company's DOS-based network operating system, on a 4M bit/sec Token-Ring LAN to link the PS/2s and the AS/400. Existing ImagePlus software runs on both the AS/400 and the PS/2s.

IBM's new offering includes an interface board for the AS/400 that provides the physical connection from the minicomputer to the mainframe running the patient information application. The minicomputer passes requests for data from LAN workstations to the host application.

Users employ a COBOL application program interface (API) provided with the product to create a host application that is used to reformat data to be shipped down to LAN workstations. The host application will wrap image control characters around that data so it can be understood by the AS/400 and displayed on image workstations, Hart explained.

Since IBM's approach enables tailoring of the system with an API, users can have a high degree of confidence that it can be modified for each of their applications, according to Scott McCready, director of image systems at IDC/Avante, a joint venture between consulting firms International Data Corp. (IDC) and Avante Technology, Inc. which are located in Framingham and Chatham, Mass., respectively.

"You want a system with 80% of the functionality required by 100% of the hospitals," McCready said. "Then, in conjunction with the vendor, you can add the 20% of functionality needed for your institution."

IBM has also tailored the image retrieval capabilities of the AS/400 ImagePlus software to the medical records environment.

The product provides 18 identifiers that can help users retrieve images. For example, a user that does not know a patient record number can key in data such as patient name, birth date or admitting physician, and the application will provide a list of related records.

Eventually, a doctor at an image workstation will be able to call up a past medical history of a patient readmitted to the hospital, Hart said.

Because patient records can contain more than 100 paper documents, the ImagePlus software has also been enhanced to segment the electronic folder containing data on a patient into as many as 99 categories, such as laboratory results and physician's orders. "Instead of pulling the entire electronic folder, I could ask for just lab reports," Hart said.

IBM Medical RecordsPlus/400 will be available on a limited basis in September, with prices ranging from $31,000 to $56,000, depending on the AS/400 model used.

After that date, IBM will announce the product's general availability, Hart said.

# Human engineering

*continued from page 2*

for $529," Bounds recalled. "We failed. Only three of 3,000 callers said the amount [properly]." Callers answered it 133 different ways.

American Express also wanted merchants to round the dollar amount of the purchase, a request delivered in a 30-sec explanation. The merchants didn't catch on until the firm brought in a human engineering specialist who developed a 2-sec prompt.

"You may be a technology person or an operations center person, but you have to remember that human [engineering] is a totally different mind-set," Bounds said. "It's more than common sense; it's basic engineering and understanding people. There is a science to asking callers questions in a way to get the response you want."

To minimize problems, American Express trials all new voice processing technologies before deploying them in production applications. "This practice is expensive and time-consuming, but it is far cheaper [in the long run] to install something small and work out the bugs," Bounds said.

Mark Fitzpatrick, a communications engineer for American Airlines, Inc., which has used voice response systems for more than seven years, learned about human engineering the hard way.

The airline installed a voice response system at its Installation Operations Center, which handles all hardware and software requests for SABRE travel agents.

"We made a major mistake when we put together a decision tree for a voice response system that didn't list the menu choices in order of popularity," Fitzpatrick recalled. "We put the most popular choice toward the end. Users became frustrated and seven out of every 10 hung up."

Fitzpatrick said the mistake was caught and corrected within a week. "We switched the choices around and put the most popular choice first," he said. "This was one of the first hard human engineering lessons we learned."

But what works for one application may destroy another.

American Airlines' eight-agent payroll center was getting swamped with calls shortly after paychecks were distributed each pay period, Fitzpatrick said. "Whenever anyone had a problem with a paycheck, they called payroll without considering that the problem might be a credit union, insurance problem or something else."

Fitzpatrick said 75% of calls to the payroll department were being referred to other departments. "Our skilled workers were spending most of their time doing call directing," he said.

To alleviate the problem, American Airlines installed an automated attendant at the payroll center, but instead of listing payroll as the first menu option, it was listed last. This got callers to "think about the nature of their inquiry and direct their calls to other departments," Fitzpatrick said.

"We also learned not to offer more than six menu choices," he said. "People can't keep more than six choices in their mind at once. And if their choice is the last one, they get aggravated because they have to sit though the others."

In addition to limiting menu choices, users are limiting the number of menus voice processing applications use.

Jan Calvert, voice information services director for Chronicle Publishing Co., a San Francisco publishing firm with newspapers in several cities, said voice processing applications should have three or fewer menus.

Calvert set up the company's first toll-free information line — which gave callers access to recorded news headlines, sports scores, stock prices and weather forecasts — with five menus. One menu included a prompt for callers that wanted to give the firm feedback on the service. "The callers told us we used too many menus," she said. "Human engineering is definitely trial and error."

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